Title: SYSTEM FOR WIRELESS EXCHANGE OF DATA WITH HAND HELD DEVICES

This application claims priority to the following US provisional applications: 60/209,882 filed 6/06/2000, 60/229,973 filed 9/02/2000, 60/242,963 filed 10/23/2000, and 60/245,517 filed 11/03/2000.

TECHNICAL FIELD

The invention relates to systems for wireless exchange of data, particularly with hand held devices.

BACKGROUND OF THE INVENTION

The background of this invention will be apparent from the attached disclosure.

DISCLOSURE OF THE INVENTION

This disclosure is attached.

Kniest Wireless Devices

The following wireless devices pertain to this application. The term "Kniest Wireless Devices" encompasses all these devices unless specifically stated otherwise.

Handheld Web Based CD Players/ Recorders

Handheld Web Based Cassette Player/ Recorders

Handheld Web Based Digital Audio Tape (DAT) Player/ Recorders

Handheld Web Based Video Gamer

Handheld Web Based Gamer & RC Controller

Web Based Handheld Book/ Periodical "Reader"

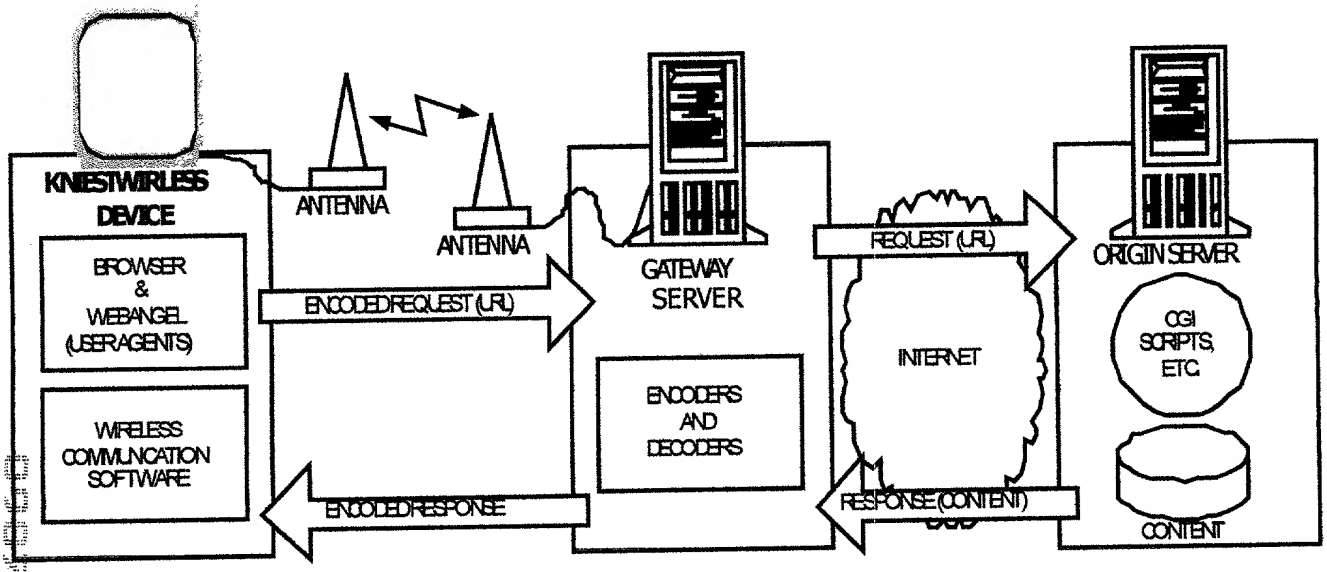
Web Based Portable Music Synthesizers

Medical Image Reviewer

Medical Ultrasound System

Wearable Versions of the above Devices

Context Diagram



WWW WIRELESS LOGICAL MODEL WITH ENCODED DATA

Web-Enabled Wireless Device Market Potential

One Billion Mobile Web-Enabled Wireless Devices by 2003*

*Yankee Group (Boston)

Example Partners in Services and Products

Company	Service/ Technology
Palm™ (3Com™)	PalmOS™ & Palm™ Electronic Hardware Design
BellSouth™	Wireless Data Network
3Com™	Servers/ Data Center & Internet Connection
Yahoo™	Content
YellowPages.com™	Content
WebAngel™	Browser Enhancement Software

Why Make Kniest Wireless Devices Palm™ Compatible?

Fastest Time to Market

Leverage off Other Applications

Open Architecture

Most Advanced Wireless Solution for Handhelds

All Kniest Wireless Devices Have a Built in Global Positioning System

What is GPS?

Global Positioning Systems (GPS) are space-based radio positioning systems that provide 24 hour three-dimensional position, velocity and time information to suitably equipped users anywhere on or near the surface of the Earth (and sometimes off the earth).

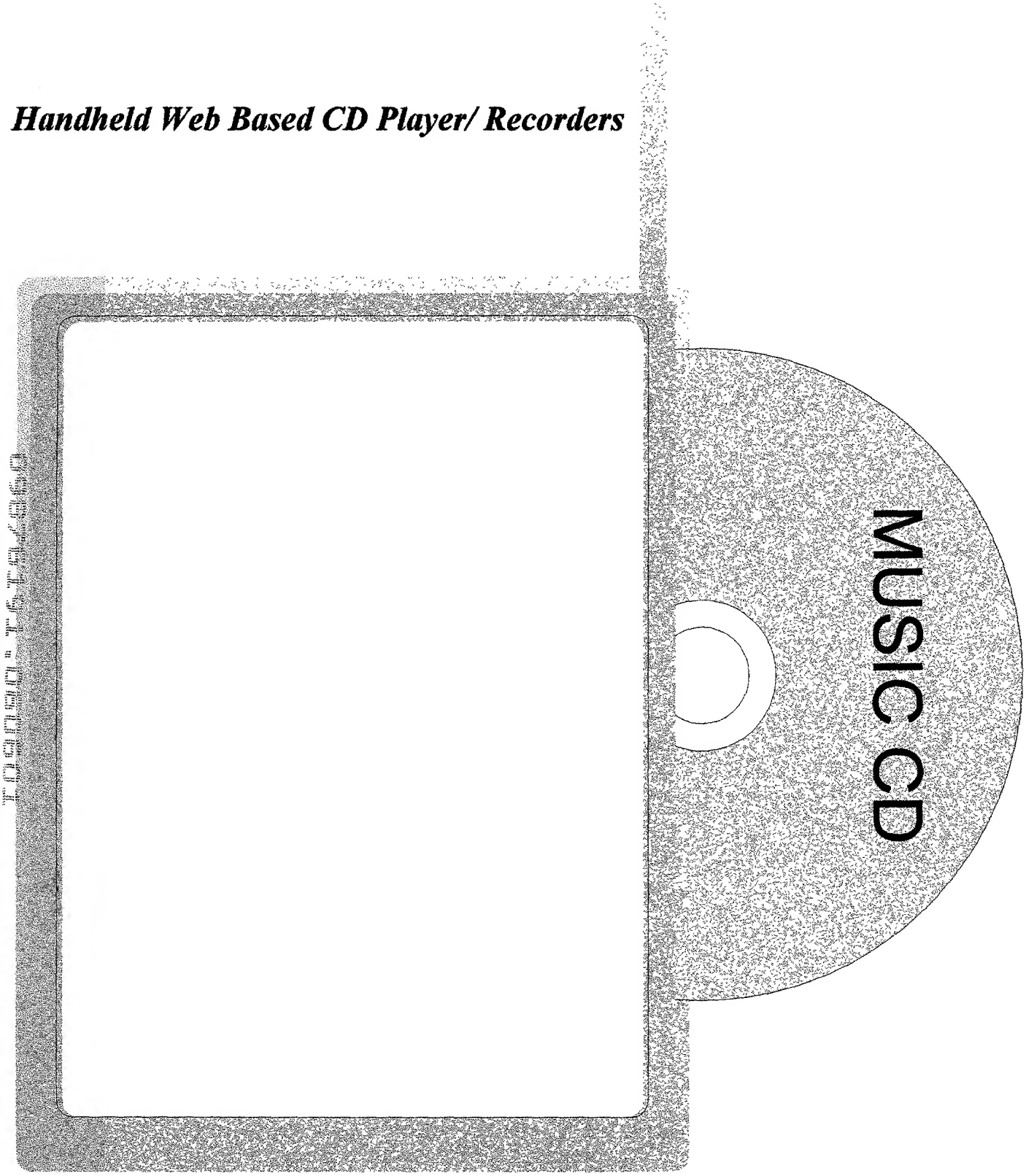
For More Detailed Information

http://www.trimble.com/gps

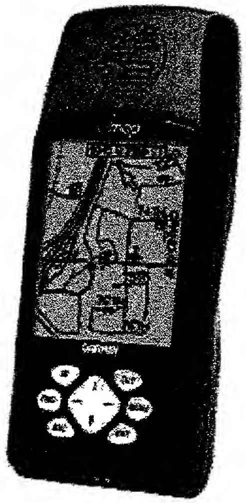
What does GPS do for Owners of Wireless Devices?

The answer will become clear after the WebAngel section below

Handheld Web Based CD Player/ Recorders



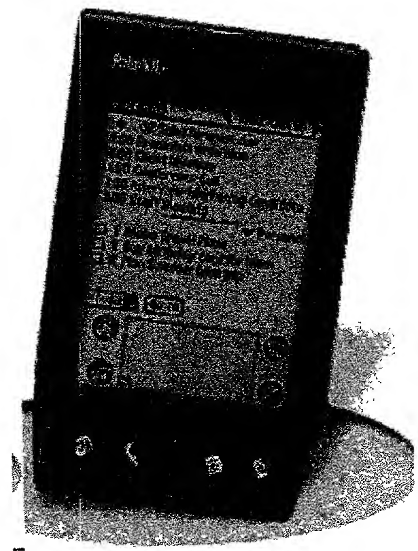
Combines CD Player/ Recorder, MP3 Player, GPS and Palm™ PDA



HANDHELD GPS

MP3 PLAYER

PORTABLE CD PLAYER



HANDHELD PDA

Features

Listen to any Music CD with Headphone Output

AM/ FM Radio

Web Browser

WebAngel User Agent

Write any Downloaded Internet Content to CD

MP3 Format Music Files
Other Compressed Audio Files
Other Files

Read WinX & Mac Compatible Files into Device from CD

Display any XML/ VML Format Internet Content

All Palm™ Basic Applications Included

Core Organizing Applications
Date Book
Address Book
To Do List
Memo Pad
Wireless Internet Messaging

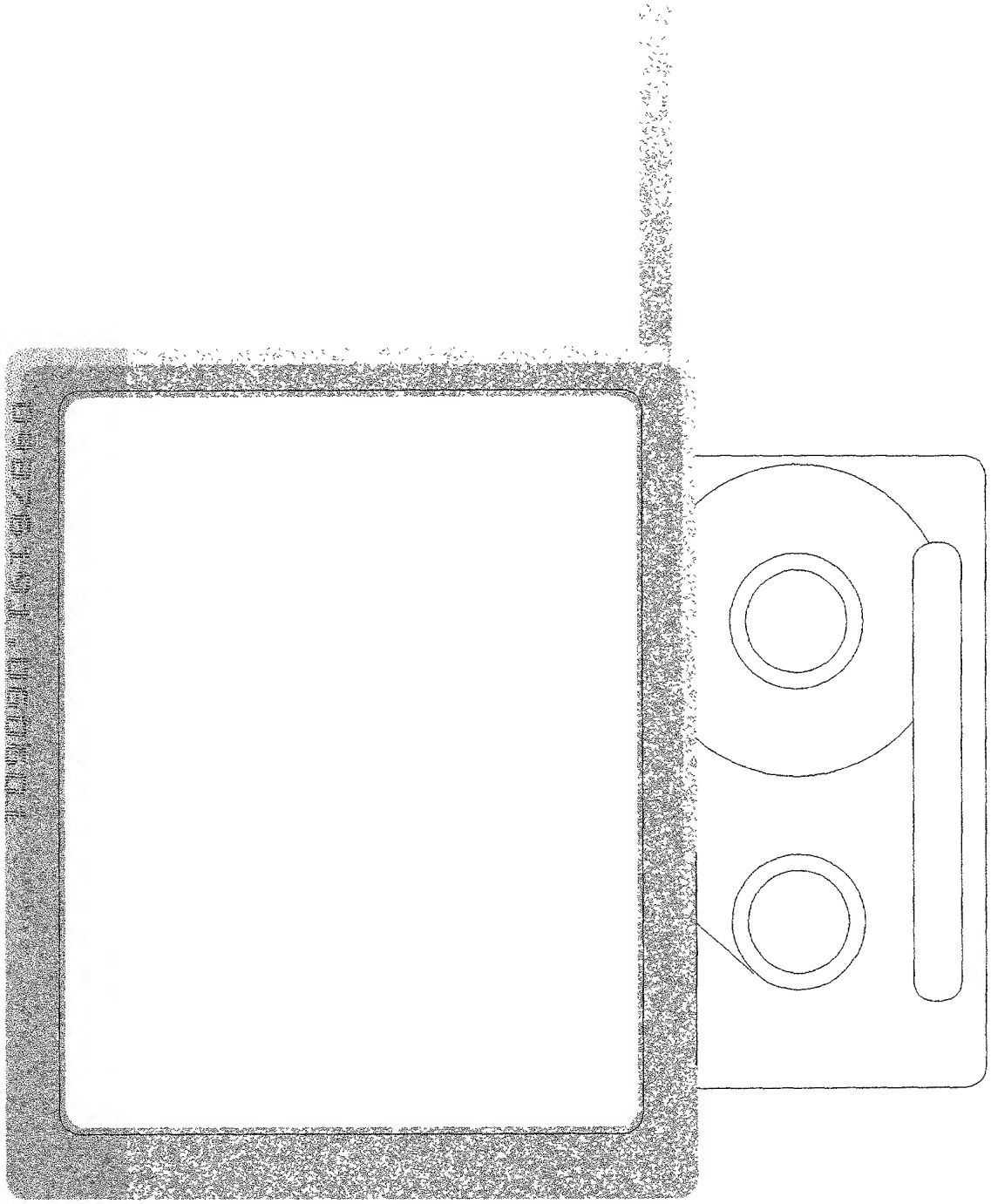
Color Touch Screen Display

Battery or AC Adapter Powered

Cradle Compatible with iRDA Port

Upload CD Files to Host PC/ Mac through iRDA Port

Handheld Web Based Cassette Player/ Recorders



Combines Cassette Player/ Recorder, MP3 Player, GPS and Palm™ PDA

Listen to any Music Cassette with Headphone Output

AM/ FM Radio

Web Browser

WebAngel User Agent

Write any Downloaded Internet Content to Cassette

MP3 Format Music Files (Analog, Possibly Digital)
Other Compressed Audio Files (Analog, Possibly Digital)
Other Files (if Digital)

Read WinX & Mac Compatible Files into Device from Cassette

Display any XML/ VML Format Internet Content

All Palm™ Basic Applications Included

Core Organizing Applications
Date Book
Address Book
To Do List
Memo Pad
Wireless Internet Messaging

Color Touch Screen Display

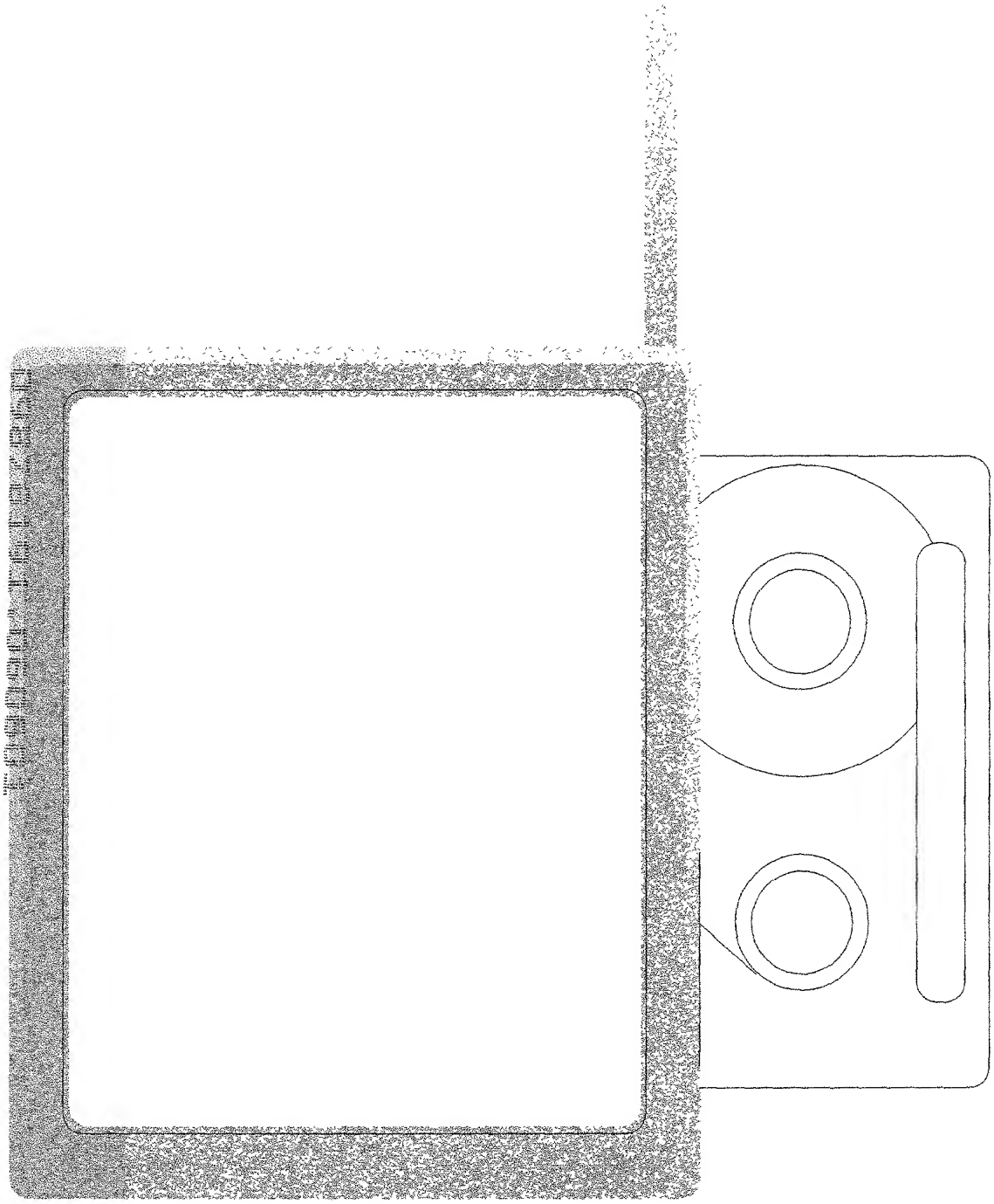
Battery or AC Adapter Powered

Cradle Compatible with iRDA Port

Upload CD Files to Host PC/ Mac through iRDA Port

Headphone Compatible Output

Handheld Web Based Digital Audio Tape Player/ Recorders



Combines DAT Player/ Recorder, MP3 Player, GPS and Palm™ PDA

Listen to any Music DAT with Headphone Output

AM/ FM Radio

Web Browser

WebAngel User Agent

Write any Downloaded Internet Content to DAT

MP3 Format Music Files (Analog, Possibly Digital)
Other Compressed Audio Files (Analog, Possibly Digital)
Other Files (if Digital)

Read WinX & Mac Compatible Files into Device from DAT

Display any XML/ VML Format Internet Content

All Palm™ Basic Applications Included

Core Organizing Applications
Date Book
Address Book
To Do List
Memo Pad
Wireless Internet Messaging

Color Touch Screen Display

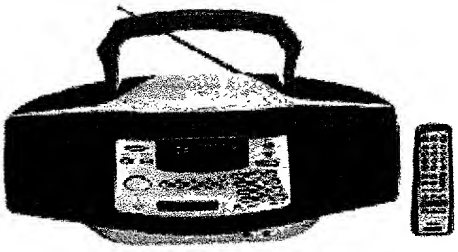
Battery or AC Adapter Powered

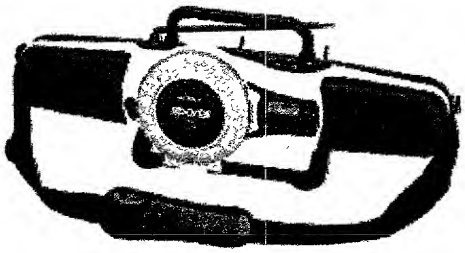
Cradle Compatible with iRDA Port

Upload CD Files to Host PC/ Mac through iRDA Port

Headphone Compatible Output

Portable Player/ Recorders (Boomboxes)





Built in Stereo Amplifier and Speakers

CD Player/ Recorder

Cassette Player/ Recorder

AM/ FM Radio

Web Browser

WebAngel User Agent

Write any Downloaded Internet Content to CD

MP3 Format Music Files
Other Compressed Audio Files
Other Files

Read WinX & Mac Compatible Files into Device from CD

Display any XML/ VML Format Internet Content

All Palm™ Basic Applications Included

Core Organizing Applications
Date Book
Address Book
To Do List
Memo Pad
Wireless Internet Messaging

Color Touch Screen Display

Battery or AC Adapter Powered

Cradle Compatible with iRDA Port

Upload CD Files to Host PC/ Mac through iRDA Port

Headphone Compatible Output

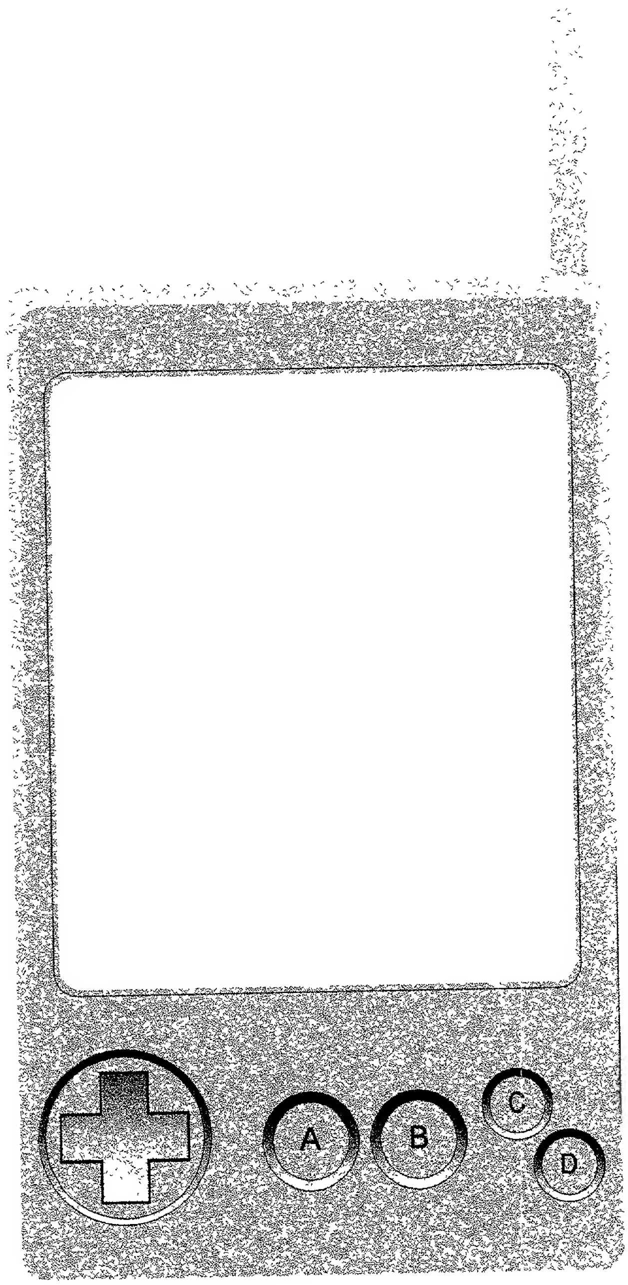
Easy to Carry Handle

Battery or AC Adapter Powered

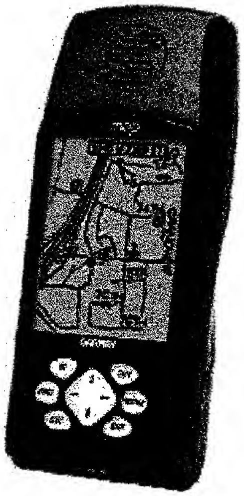
iRDA Port

Combines CD & Cassette Player/ Recorder, MP3 Player, GPS and Palm™ PDA

Handheld Web Based Video Gamer Devices

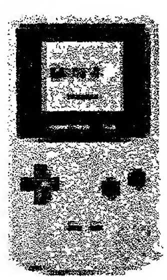


WebGamer Combines Nintendo Gameboy, MP3 Player, GPS and Palm™ PDA

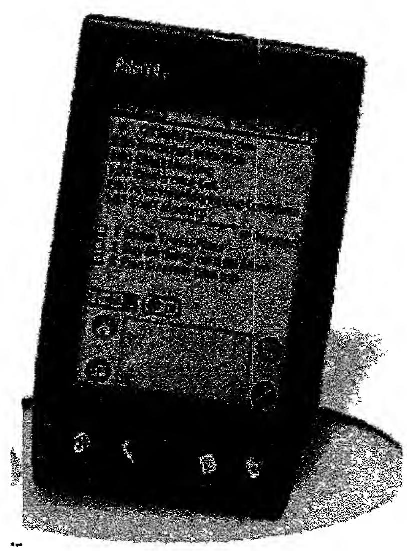


HANDHELD GPS

MP3 PLAYER

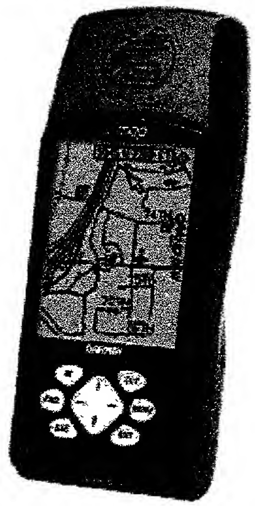


GAMEBOY



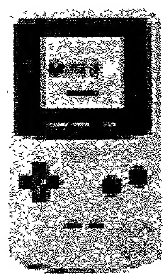
HANDHELD PDA

WebRCgamer Combines Nintendo Gameboy, RC Controller, MP3 Player, GPS and Palm™ PDA

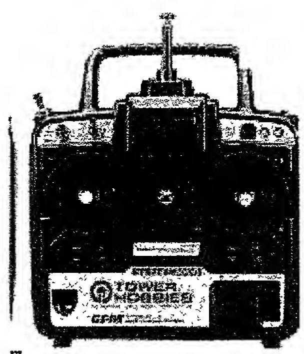


HANDHELD GPS

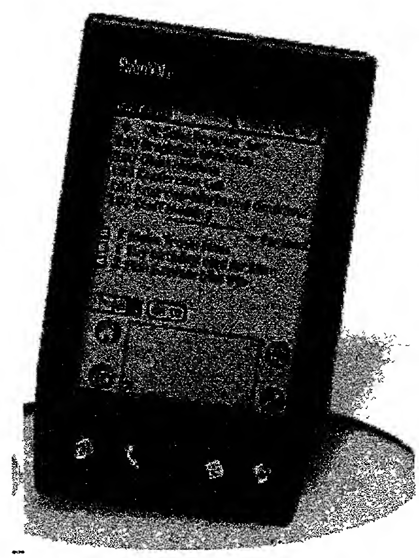
MP3 PLAYER



GAMEBOY



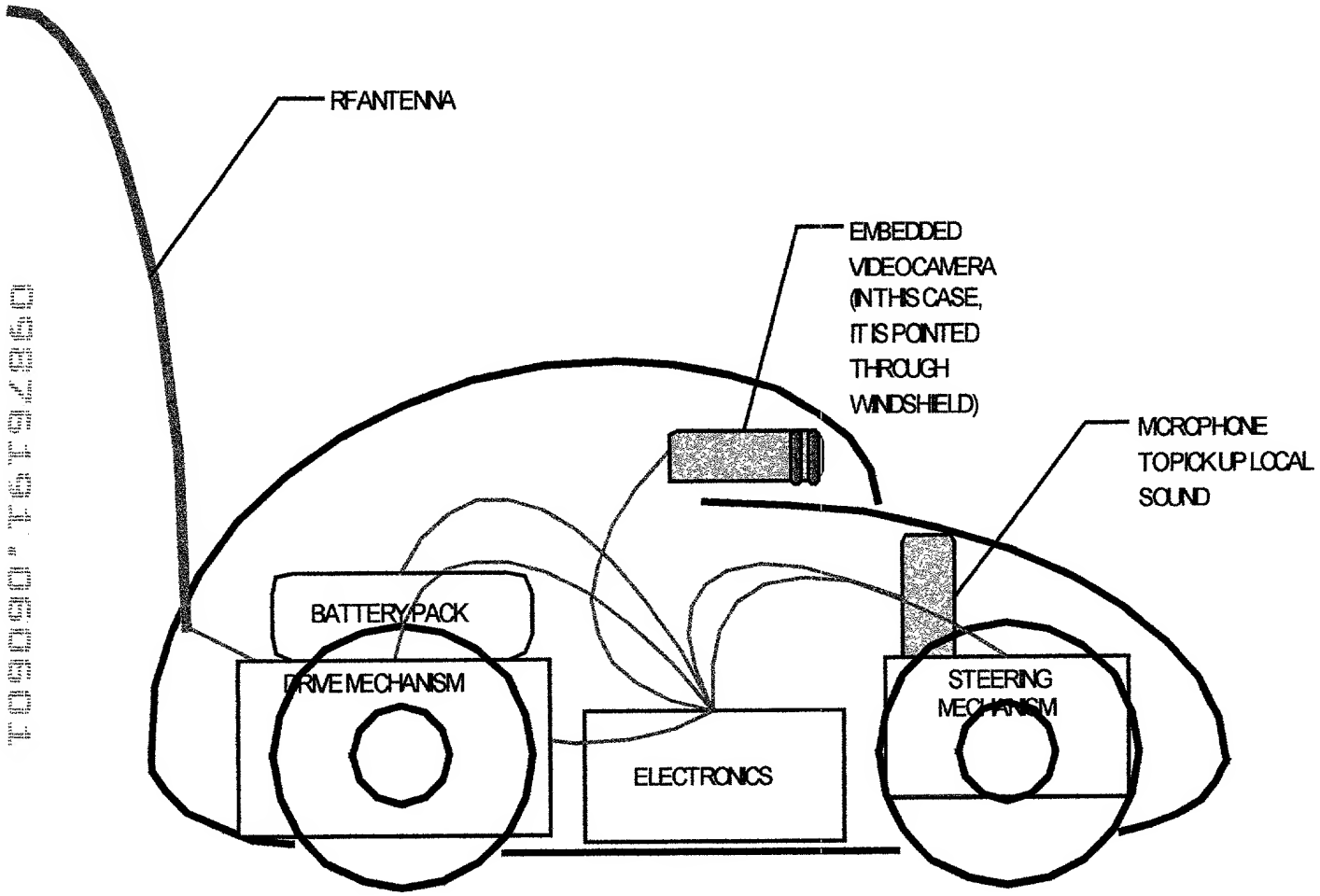
RADIO CONTROLLER



HANDHELD PDA

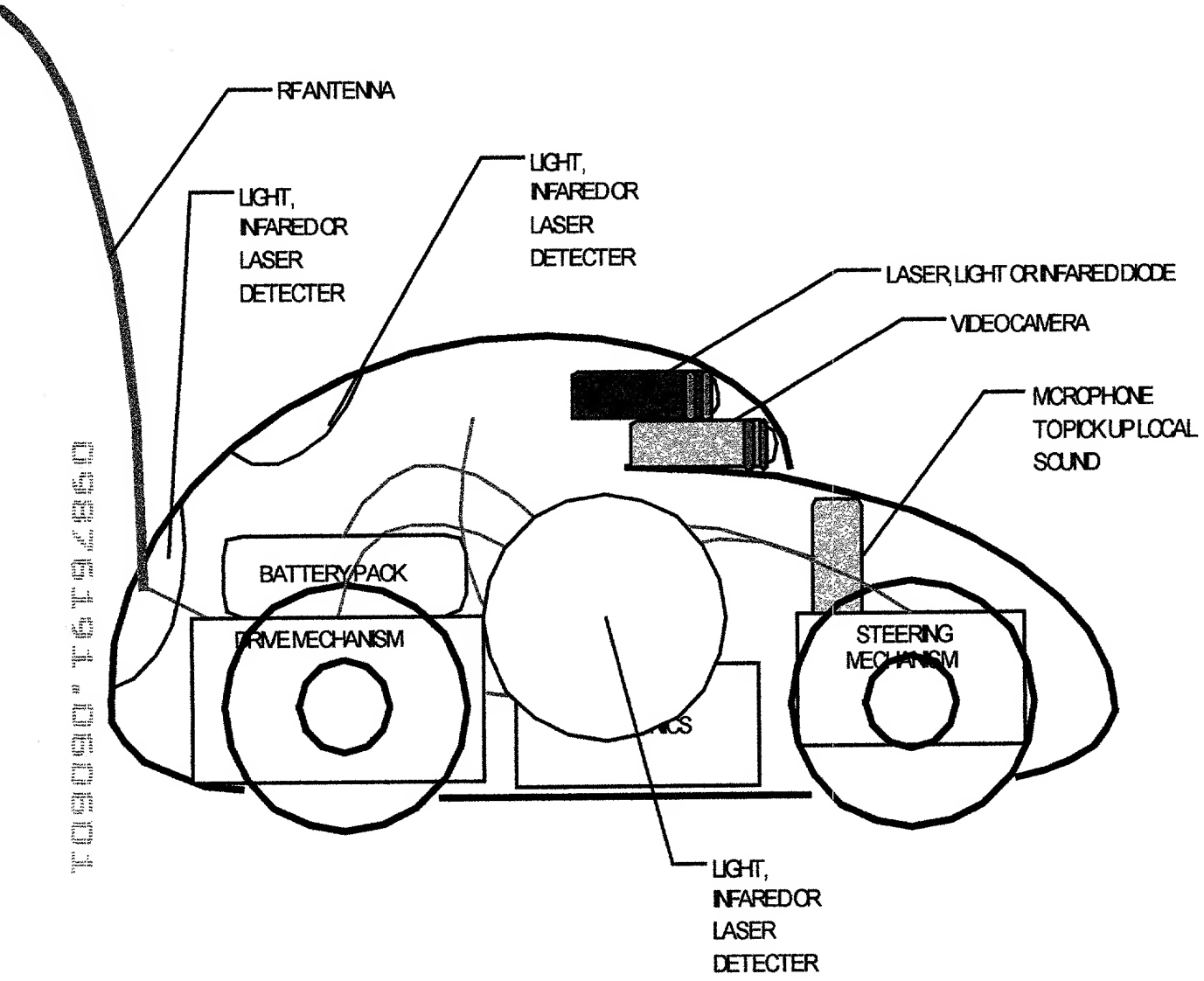
Radio Remote Toys Controlled by WebRCgamer

Cars, Boats, Airplanes, Airships with Built in Video Cameras and Microphones Bluetooth and/ or Other Radio Frequency Protocol for Communication Between Toy and WebRCgamer Controller



WebRCgamer Controls Vehicle and Provides Video Image and Audio Playback of Actually "Being" in the Vehicle!

Laser Tag with Radio Remote Vehicles!



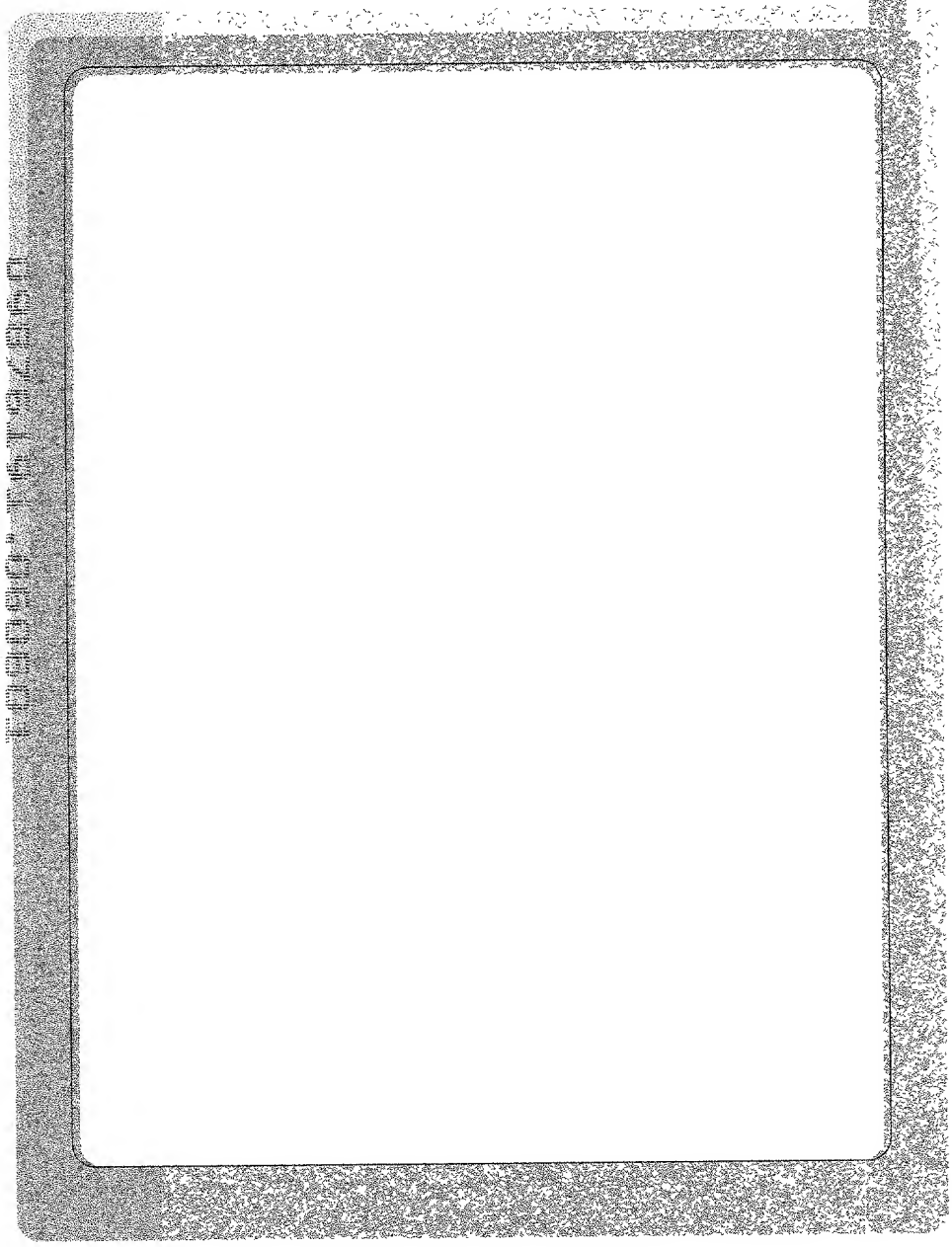
Players "Shoot" at Each Other! WebRCgamer Keeps Score!

Alternative Technologies to "Shoot" Each Other

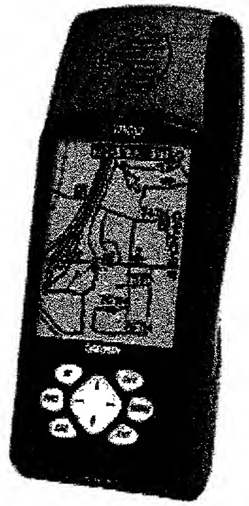
Radio Waves
Ultrasound

Video Camera and Microphone are Optional

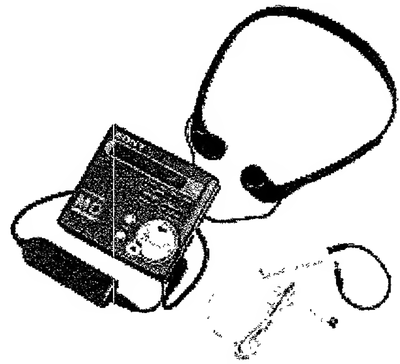
Handheld Web Based Book/ Periodical "Reader"



Combines Palm PDA, MP3 Player, GPS and SoftReader™

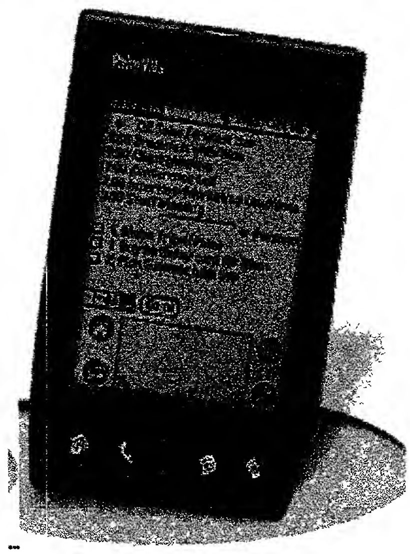


HANDHELD GPS



MP3 PLAYER

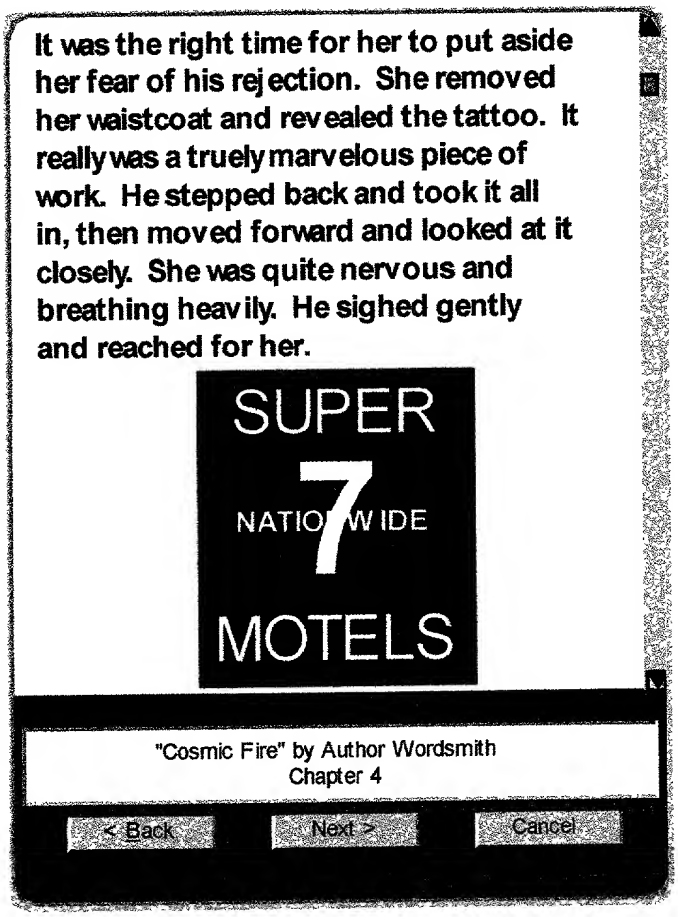
SOFTREADER



HANDHELD PDA

With WebReader one could be Reading a "Free" Book off the Web

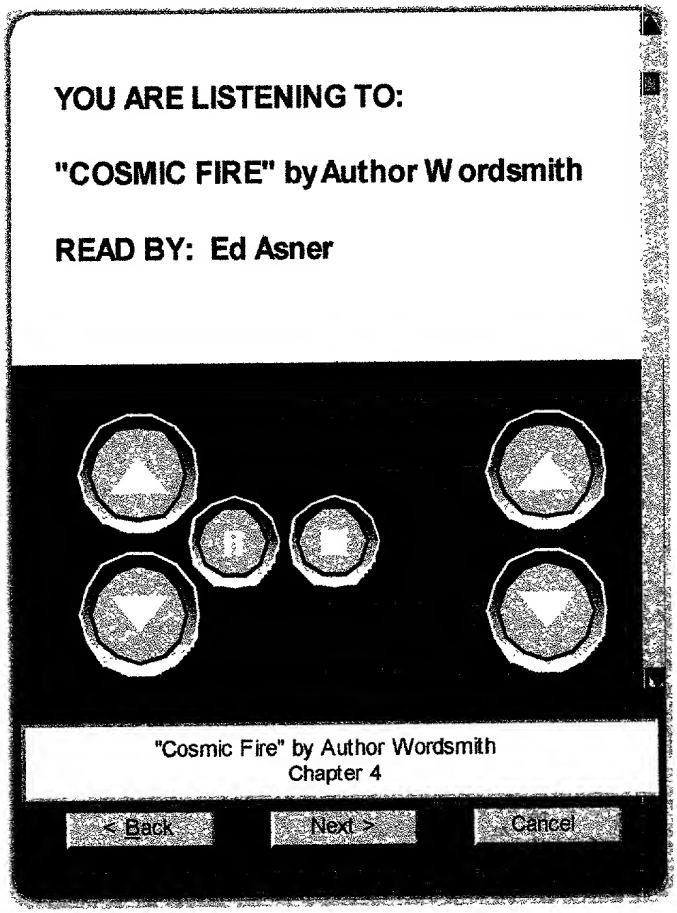
Advertising Embedded in Book



Adjustable Font Size for Easy Reading

One can Listen to a Book off the Web

Keeping the Reader's Voice Output (Like a Book on Tape)

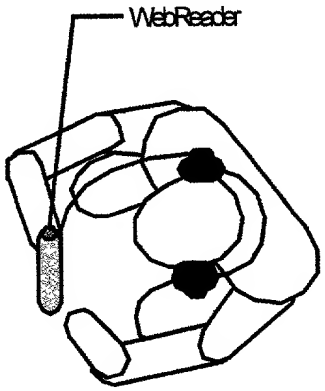


Controls

Volume
Playback Speed Without Affecting Speech Timbre
Pause
Stop
Play

Sharing a Book – Mom's Away on a Business Trip

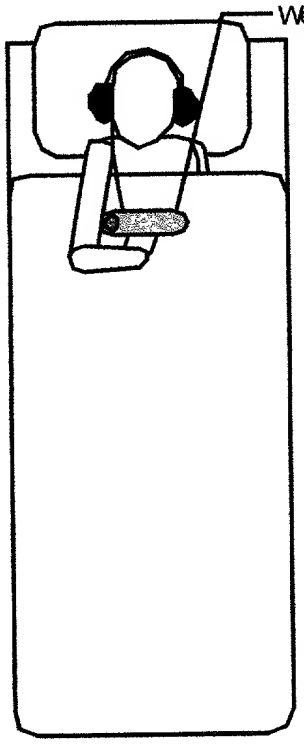
MOM'S READING A STORY TO HER CHILD AT HOME



MOM CAN READ TO HER CHILD AS THEY SHARE THE SAME BOOK TOGETHER.

THERE EVEN COULD BE A VIDEO LINK BETWEEN THEM

AT HOME - CHILD CAN HEAR MOM'S VOICE AS SHE READS THE BOOK. THE TEXT DISPLAY IS CONTROLLED BY MOM'S W EBREADER.



Feature Summary

Downloads Desired Reading Material off the Web

Color Touch Screen Display

Adujustable Playback Speed

Speech Engine for Accurate Cadence and Timbre

Text to Speech Engine for Text Only Input

"Outdoor" Case

Web Browser

WebAngel™ User Agent

Headphone Compatible Output

Headphones

Battery or AC Adapter Powered

Cradle Compatible with iRDA Port

Potential for at Least Two Product Offerings

WebReader 101

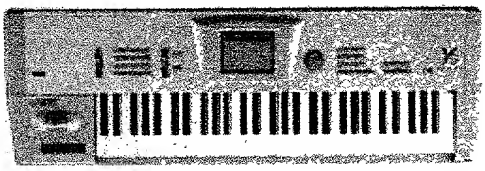
All Features Listed Above

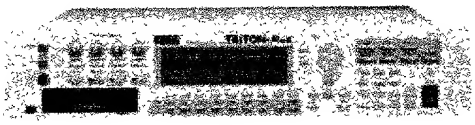
WebReader 303

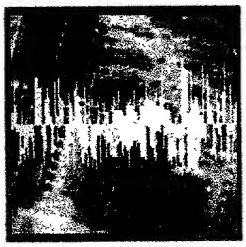
All Features Listed Above

"Sharing a Book" Capability

Music Synthesizers







Synthesizers with Physical Modeling Technology

What is Physical Modeling?

Computer Simulates Actual Operation of Musical Instruments

More Accurate Sound Synthesis of Practically Any Instrument Imaginable

More Dynamic than Sampled or Additive Synthesis

For The Piano

Digital Waveguides to Simulate Vibration Modes of the String

Simulates Piano Hammer Striking a String

Simulating the Sound Board and Piano Body

Capturing the "Soul" of the Piano

Extremely Complicated Instrument

Current Digital Pianos and Synthesizers are Still Inadequate

Processing Power Now a Possibility for Incredible Piano Emulation

High Speed Floating Point Digital Signal Processors Possible
Multiple Floating Points DSPs on a Single Die
RAM Costs Dramatically Reduced

Other Instruments (Patches) must be Available

General MIDI Specification – Over a 128 Different Instruments
Kniest Instruments Meet General MIDI and XG® Requirements
License Technology for Outside Sources

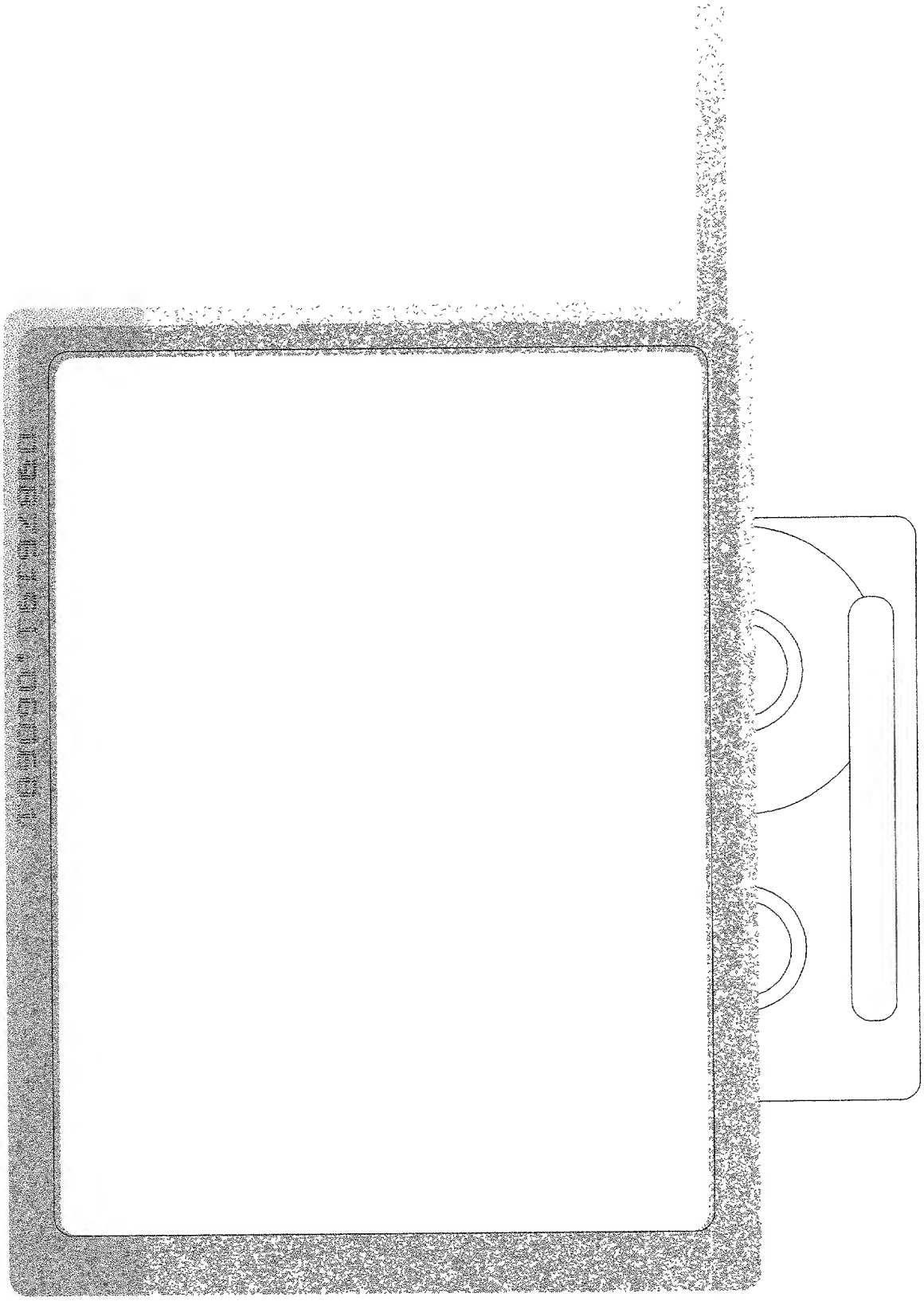
Kniest Synths can Change Instrument Materials for Different Sounds

Steel Clarinet
Wood Tuba
Plastic Flute

Mix and Match!

Clarinet Mouthpiece – Tuba Body
Trumpet Mouthpiece – Clarinet Body
Violin Bow on Piano (Instead of Hammer)
Piano Hammer on Guitar

Mobile Medical Assistant

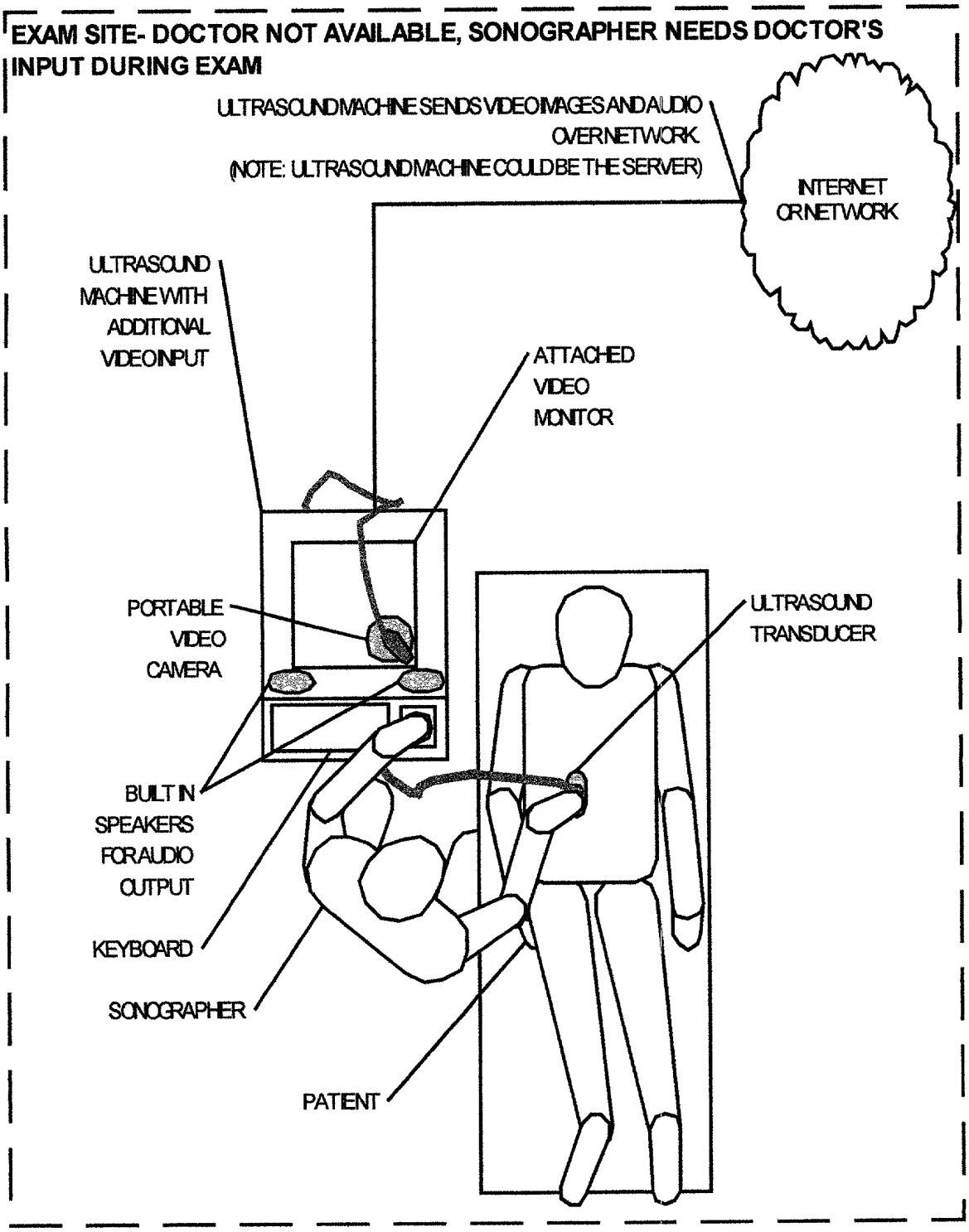


Color Touch Screen Display
"Outdoor" Case
Browse Web for Medical Images
Receive Images via E-mail
WebAngel™ User Agent for Automatic Downloads
Voice Recognition Software for Diagnosis Retention
Headphone Compatible Output for Doppler Analysis
Battery or AC Adapter Powered
Cradle Compatible with iRDA Port
Built in Microphone
Built in Video Camera
Mini VHS Cassette Player/ Recorder
RGB, NTSC or PAL Video Output
Cineloop™ Feature*
"Loop" Storage on Internal Hard Drive
WebAngel Image Enhancement Algorithms
WebAngel Image Measurements/ Calculations
Voice Recognition and Text to Speech Output
Partnership with Medical Database Provider

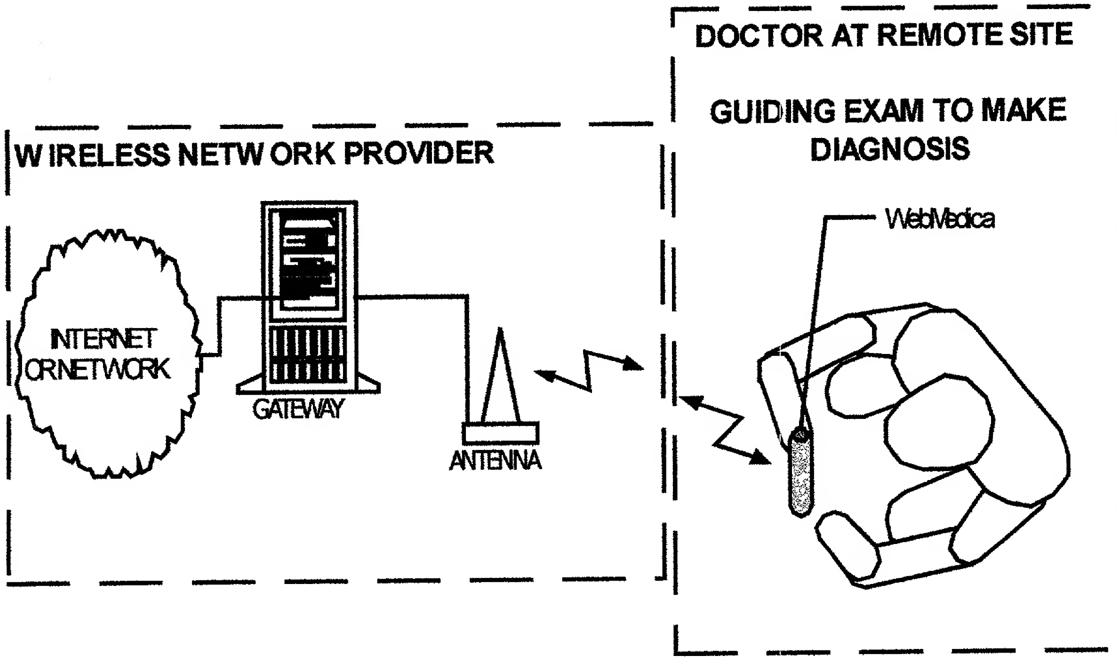
http://www.sybase.com/mobilehealthcare/

**** Cineloop™ is a registered trademark of ATL-Ultrasound***

Remote Diagnosis Context Diagrams



Context Diagrams – Continued

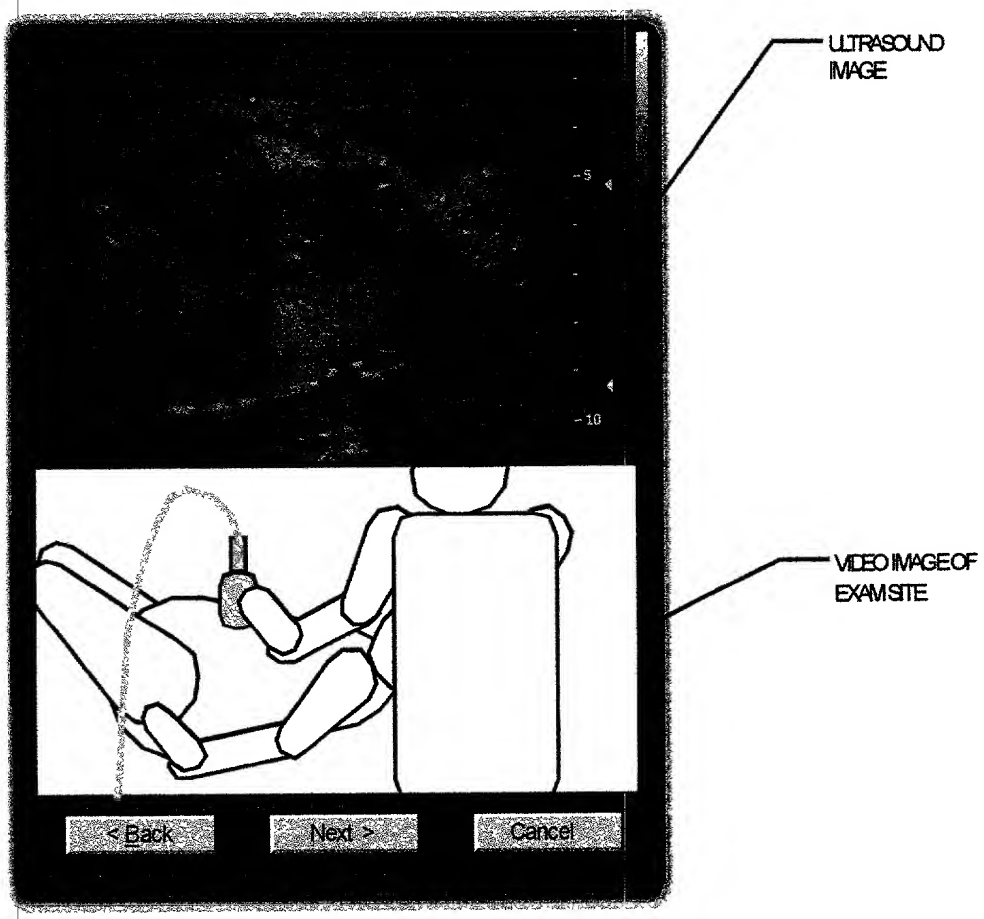


Remote Diagnosis Scenario

In this scenario, the doctor is guiding the exam remotely. The doctor in this case could be an OB-Gyn who is at home while one of his/ her patients is in labor. Before deciding to go in to meet with the patient (in person), the doctor may direct the sonographer on where to "look" or place the probe on the patient's body.

Ultrasound Image and Video Camera Image on WebMedica Display

The WebMedica has two images on the display, the ultrasound image generated by the ultrasound machine and the camera output to help the doctor see where the transducer is placed on the woman's body. The camera output is processed by the ultrasound machine (or some other device) and sent to the server. The doctor has the option of controlling the video camera from WebMedica. Video camera control consists of focus, panning and zooming.



Doctor Provides Direction on Transducer Placement

The doctor provides direction to the sonographer by speaking into the WebMedica microphone, which records the voice input and sends it back to the ultrasound machine. The ultrasound machine outputs the doctor's orders through its embedded audio/ speaker system.

Doctor and Patient Conference Capabilities

The doctor could also converse with the patient directly through the same medium.

It is conceived that some WebMedica devices could have a built in (or attachable) video camera to provide an image of the user back to the ultrasound machine. The ultrasound machine would output the video image on its monitor. Essentially then, it would be a "video conference" with the handheld device being one terminal, and the ultrasound machine being the other!

Remote Ultrasound Machine Control

The doctor could also CONTROL the settings on the ultrasound machine through WebMedica. This would reduce the technical requirements of the sonographer. It is conceived that the sonographer could be anyone willing to hold the transducer on the patient with guidance from a qualified medical professional.

Not Limited to Ultrasound Applications

This scenario is not limited to ultrasound applications. It is conceived that it could be used with any medical imaging modality.

Ultrasound Transducer Blanket System

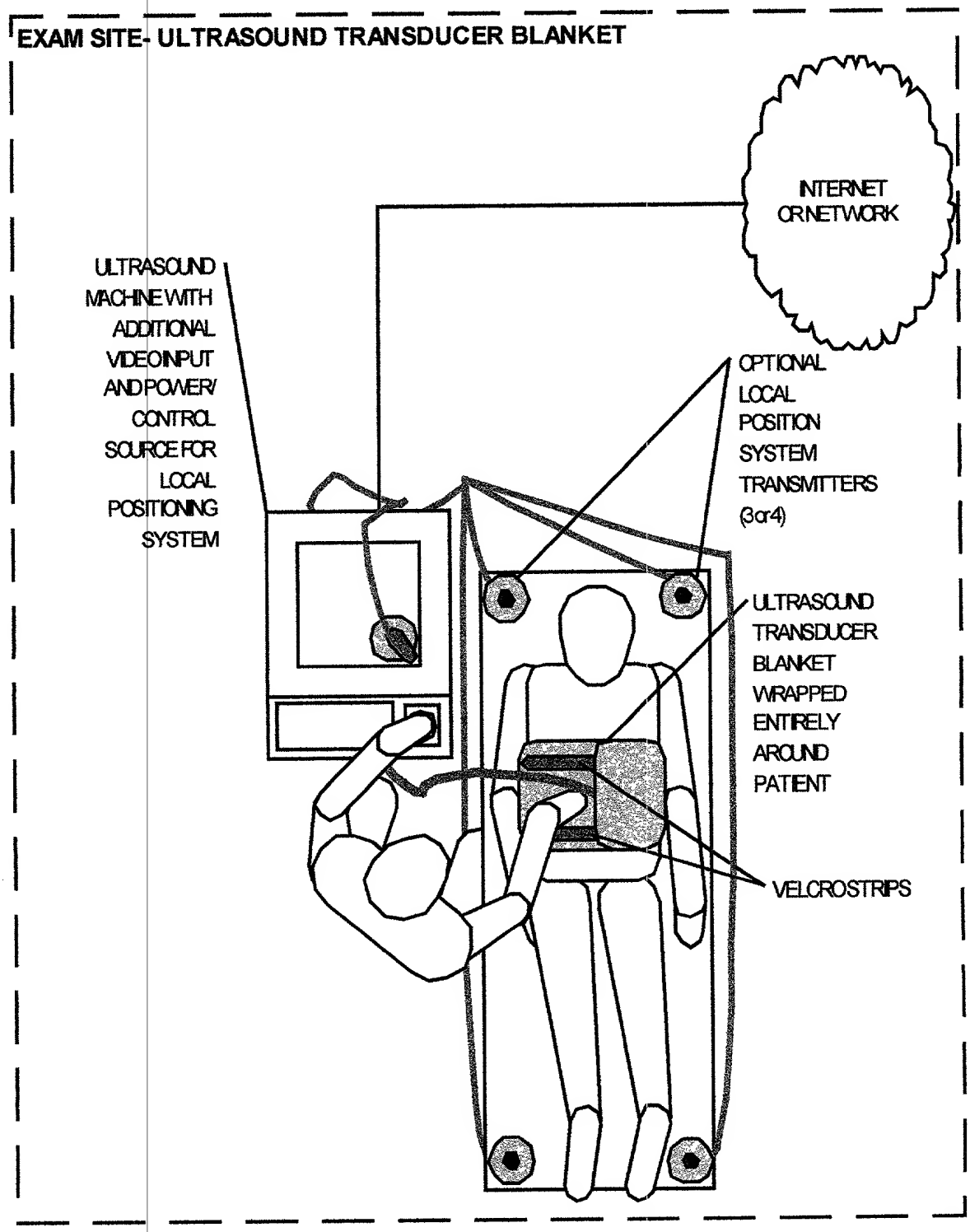
Transducer "Blanket" Wrapped around (or Placed on) Patient

Blanket has Multiple Transducer Assemblies Embedded in it
Ultrasound Machine uses one Transducer Assembly at a Time (Multiplexed)

Requires no Technical Expertise to Capture Medical Images
Good for Remote Diagnosis

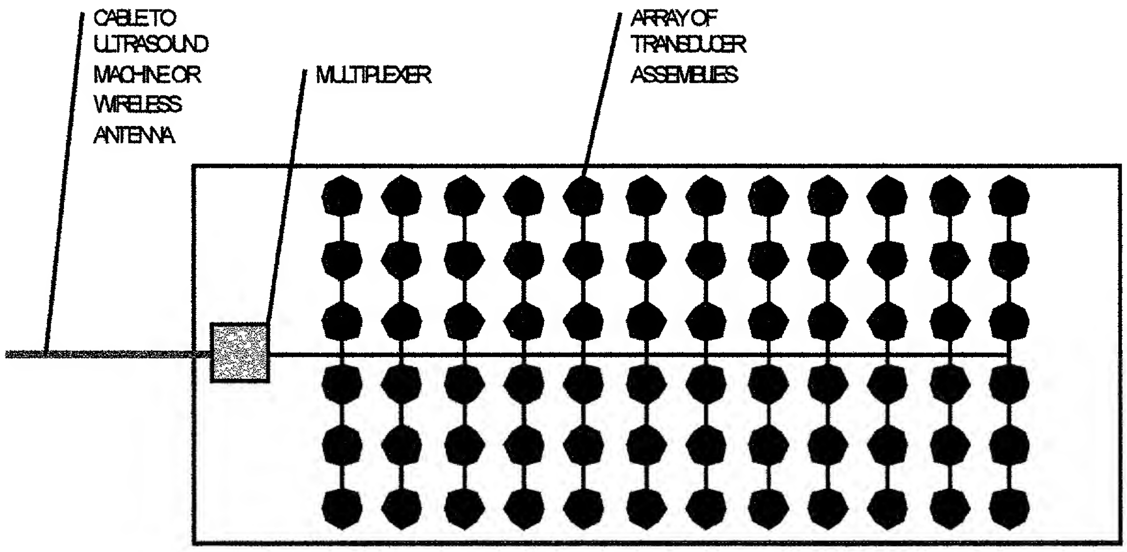
Blanket has Velcro Strips Outside
Keep it in Place During Exam
Adjustable for Different Parts of the Body

Ultrasound Transducer Blanket System Context Diagram



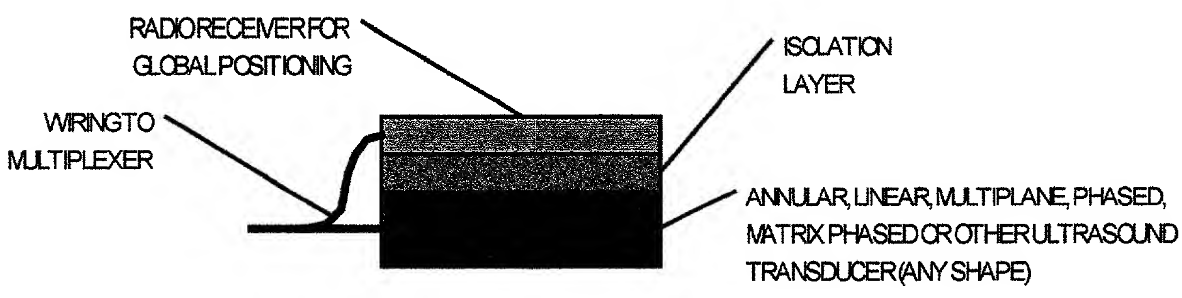
Each Transducer Assembly may have a Global Positioning System

Global Positioning System with Higher Resolution (Local System)
Allows 3D Imaging!

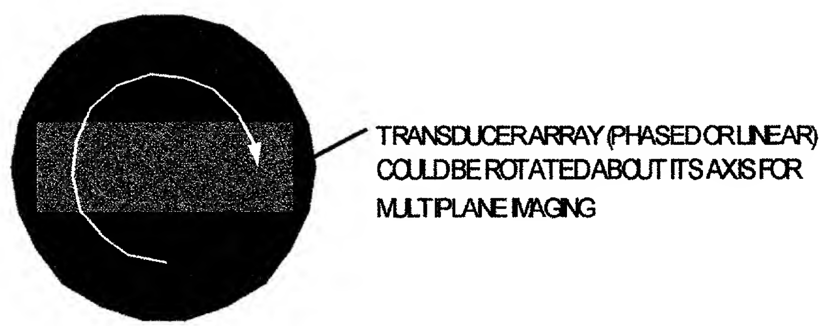


INSIDE ULTRASOUND TRANSDUCER BLANKET

Transducer Assembly Diagram



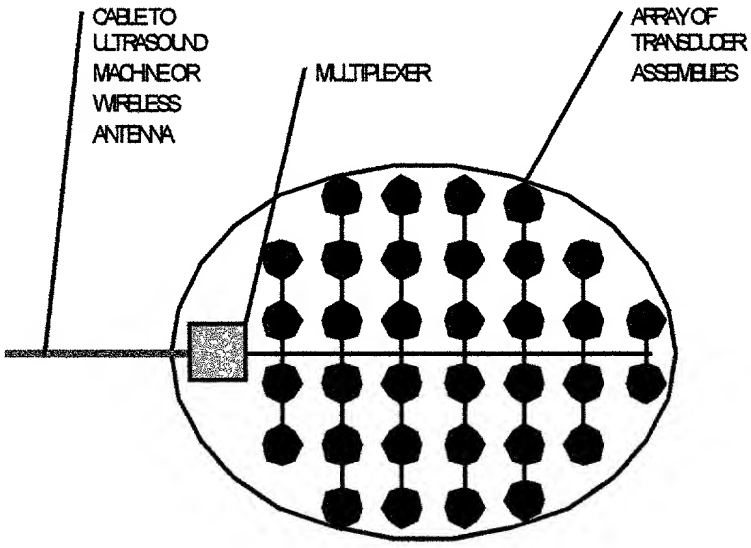
SIDE VIEW OF TRANSDUCER ASSEMBLY



MOTORIZED MULTIPLANE TRANSDUCER FACE

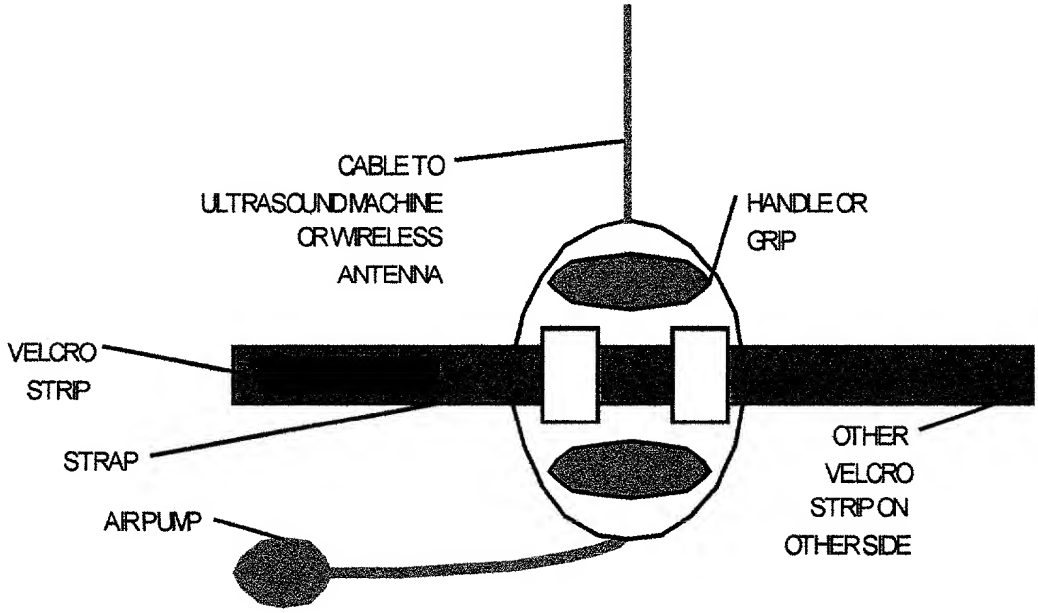
Ultrasound Blanket could be a Pad

Multiple Transducers Embedded in Pad that is Placed at Strategic Points on the Body

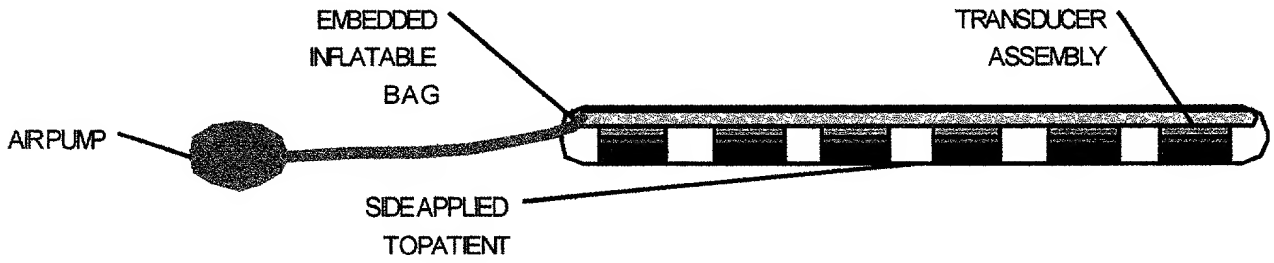


INSIDE ULTRASOUND TRANSDUCER PAD

Pad has Strap to Keep it Stationary



Blanket (or Pad) is Inflated Similarly to the Blood Pressure Sleeve to Ensure Good Coupling to the Body

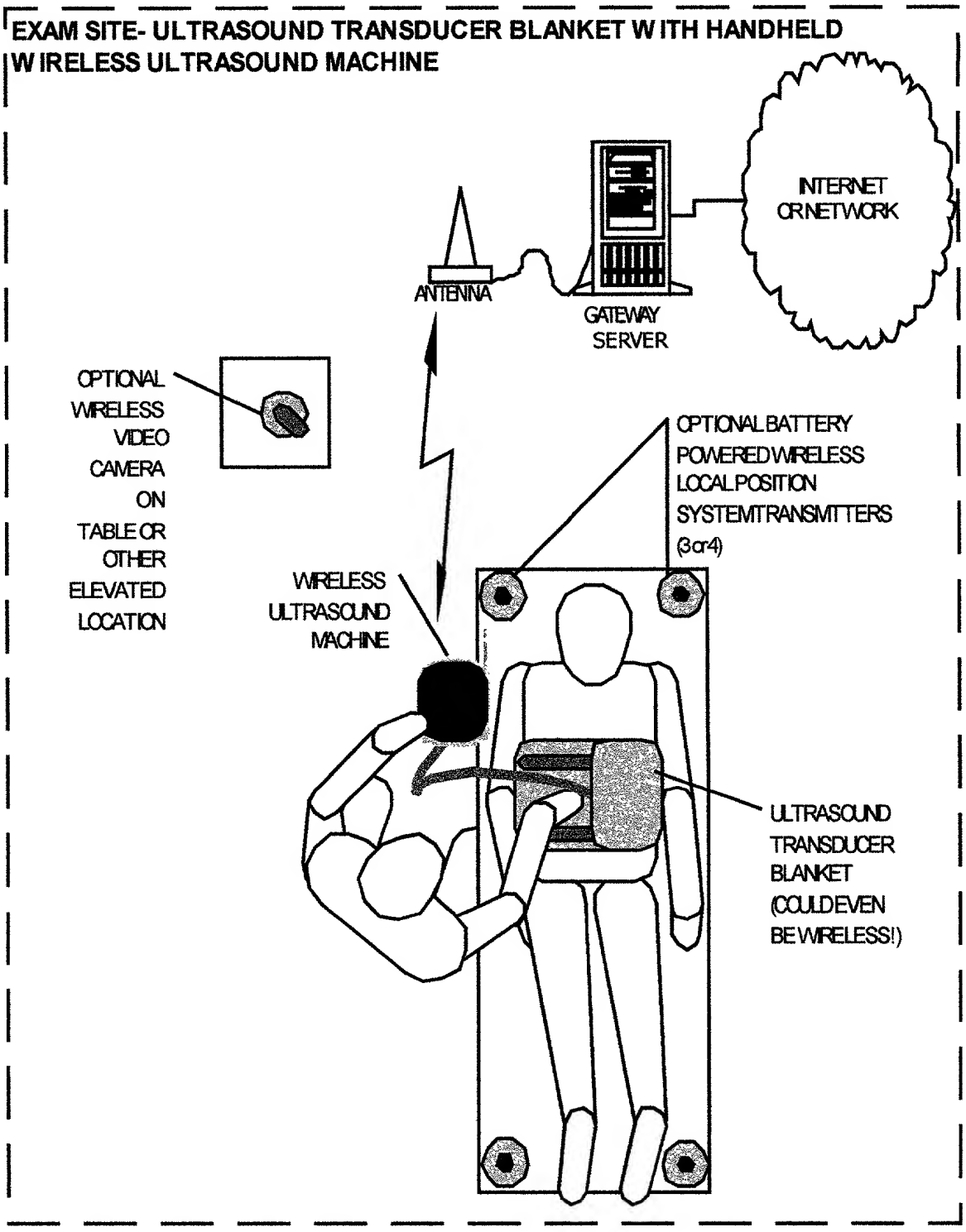


SIDE VIEW OF PAD OR BLANKET

Ultrasound Exam Procedure

Ultrasound Coupling Gel is Applied to Entire Surface of Pad or Blanket
Pad or Blanket is then Placed on Area of Interest
If Needed, Pad or Blanket is Strapped to Patient
If Needed, Pad or Blanket is then Inflated to Ensure Proper Pressure Against Body
Ultrasound Images Gathered and Processed

Ultrasound Machine may be Smaller or have Wireless Functionality!



WebAngel Software

Pre-Fetching Engine Gathers Information in Advance

Uses Currently Viewed Content for Links to Other Web Sites

Timer Driven Automatic Update

Favorite Refresh Automatic Update

Environmental Change Automatic Update

Adaptable Feature Configuration

Automatic Push

Changing Conditions Where WebAngel Automatically Forward Caches, Pushes or Modifies the Feature Configuration

Time of Day/ Week/ Year	Time Since Last Content Update	Weather
Velocity	Acceleration/ Deceleration	Location
Specific User/ Owner	Security	Other Safety Constraints/ Danger
Vibration/ Impact/ Earthquakes	Ambient Noise	Humidity
Pitch	Depth	Altitude
Device Temperature	Ambient Temperature	Client or Server Temperature
Nuclear Radiation	Other Conditions of Devices	EMI/ RFI
Wind Velocity	Odor Detection	Ambient Light
Chemical Detection	Construction	Detour
Service/ Fuel Availability	Dust/ Pollution	Plague/ Pestilence
New Laws/ Judicial/ Government	Scheduled Time/ Event	Health of Person or People
X-Rays	Gamma Rays	Ultrasound
Traffic	Rioting	Wetness
Spectral Content of Light	Spectral Content of Sound	Acts of God
E-mail	Network Messages	New User Input
Diagnostic Failure of a Device	Internet Web Site "Hits"	Server Traffic on Network
Client Traffic on Network	Internet Traffic	Changes in Internet Content

Connection Arbitration

WebAngel Automatically "Finds" Most Appropriate Wireless Protocol

Example: Kniest Device Needs to Connect to Internet. Kniest Device has two protocols for Wireless Connection, Bluetooth and BellSouth™. WebAngel would "Search" for Bluetooth Server First (which may be Free), then Wireless Network Supplied by say, BellSouth™ which may have Connection Charges

Image Enhancements

Edge Detection

Line Interleave

Grayscale Adjustment

Chroma

Multiple Displays

Pan and Zoom

Image Measurements

Distance

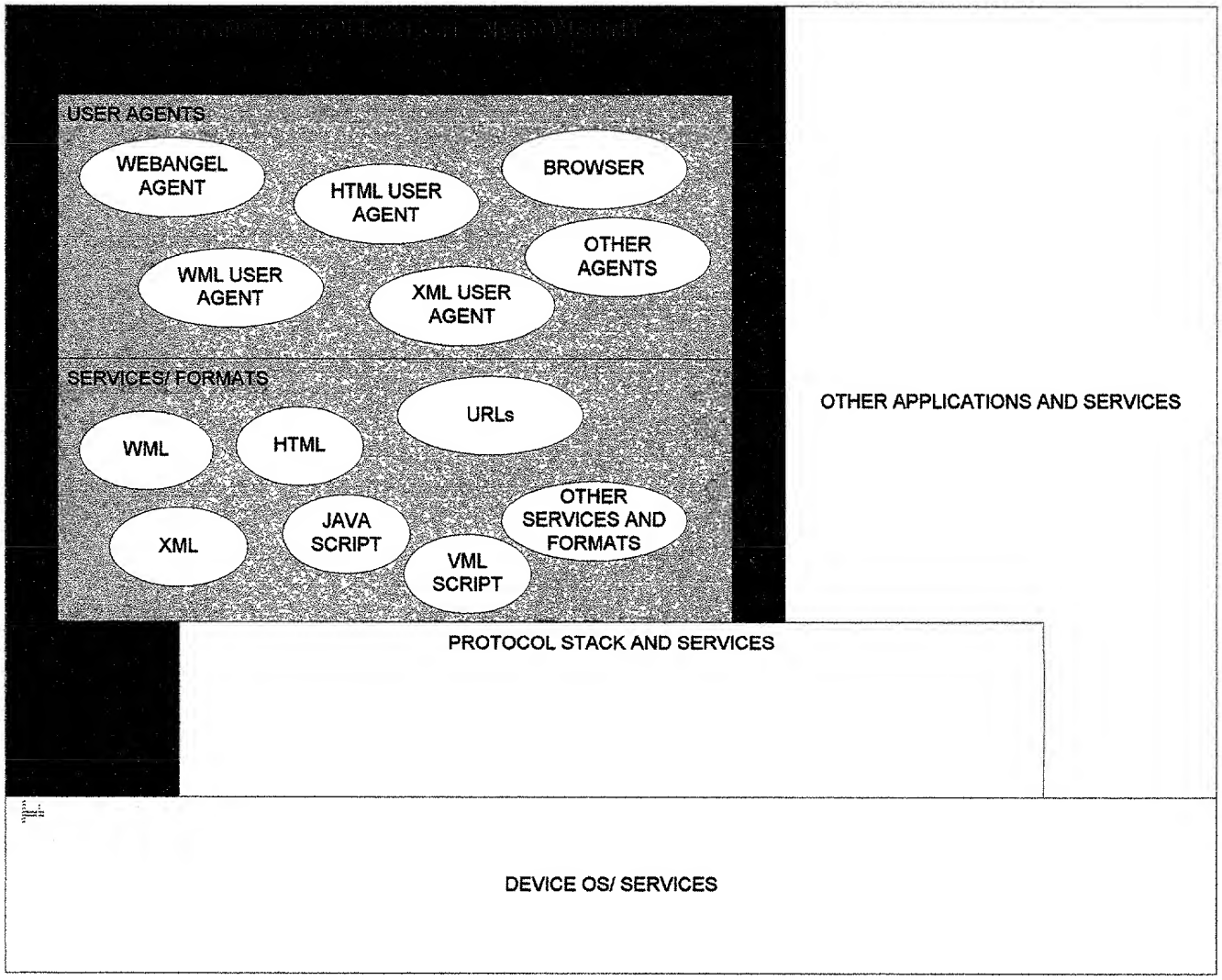
Area

Volumes

Velocity (Medical Application)

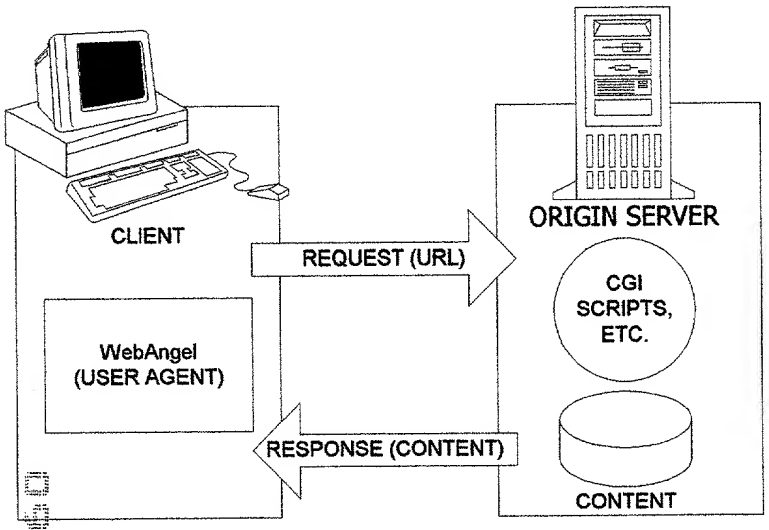
User Agent Software

The following diagram illustrates how WebAngel fits into the host software:



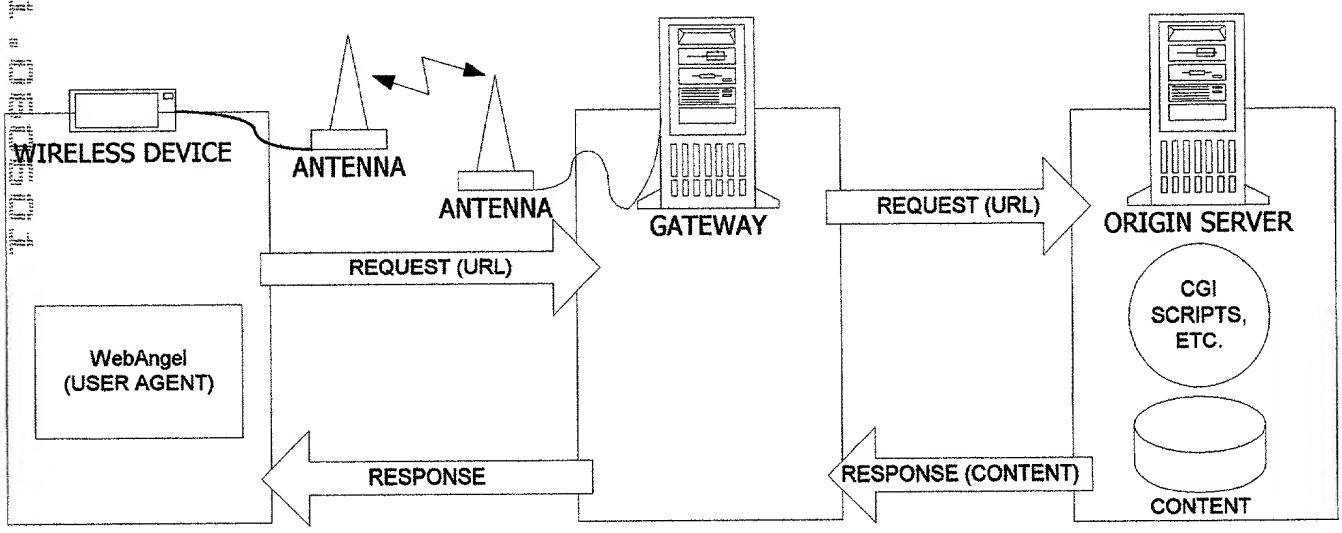
WebAngel includes any of the above user agents or services/ formats.

User Agent Software on World Wide Web



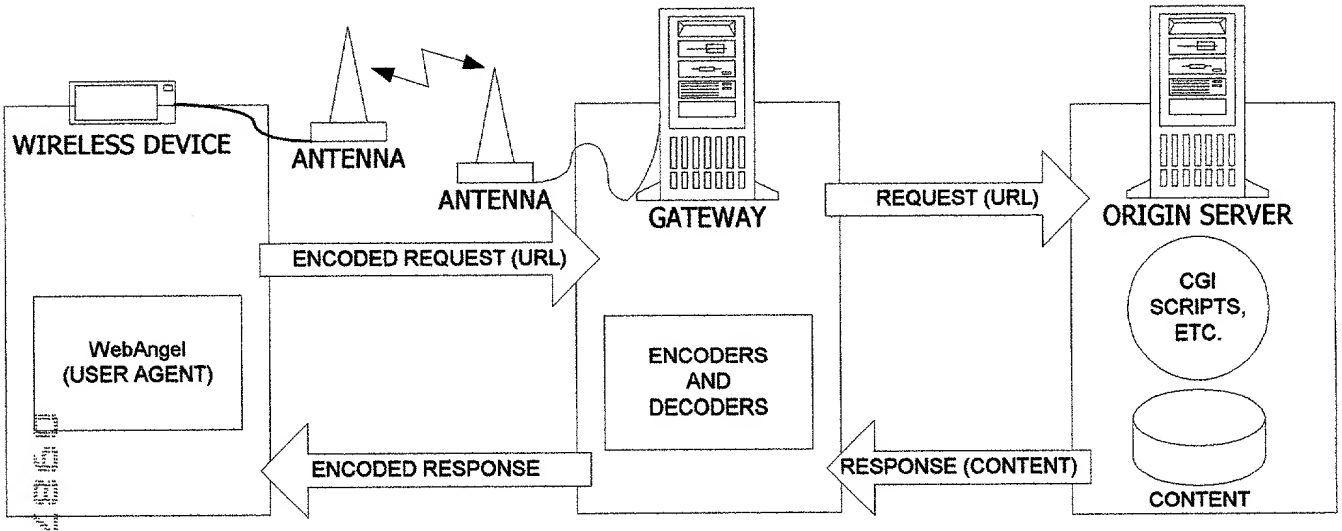
WWW LOGICAL MODEL

Wireless Device Context



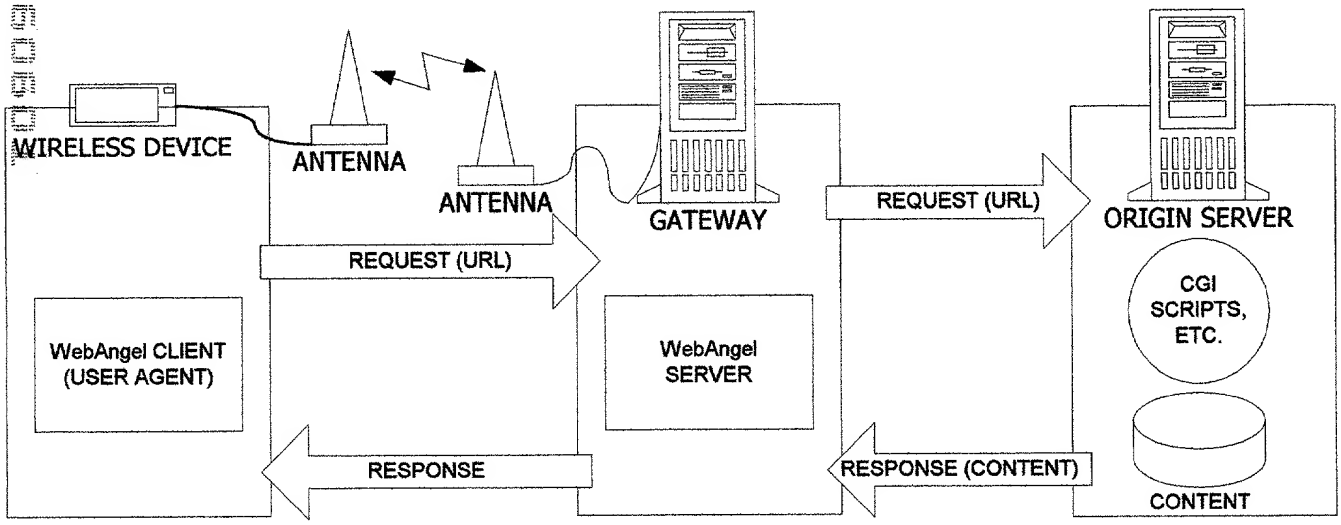
WWW WIRELESS LOGICAL MODEL (WITHOUT ENCODING OR DECODING DATA)

WebAngel Utilizing Encoded Data



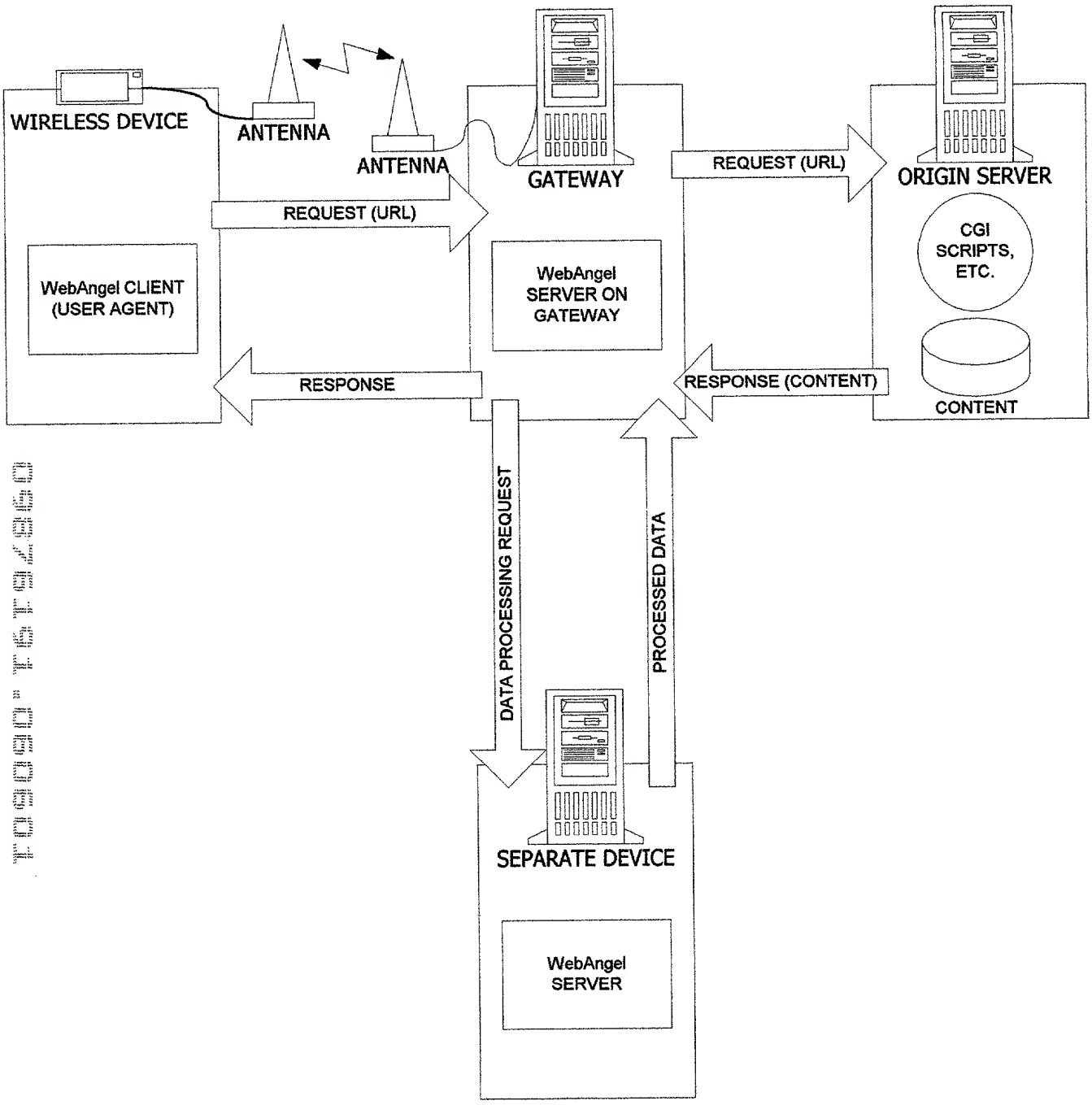
WWW WIRELESS LOGICAL MODEL

WebAngel Running Partially on Server(s) (Encoded or Decoded)



WWW WIRELESS LOGICAL MODEL WITH WebAngel CLIENT AND SERVER

Data in this case is processed on another device (through a network, Intranet or over the web also):



WWW WIRELESS LOGICAL MODEL WITH WebAngel SERVER ON MULTIPLE DEVICES

Data processing in the above case means converting it to another format for transmission or interpreting the content and refining it for the client.

WebAngel Software Detailed Description

Cache Forward Engine Gathers Information in Advance

Uses Currently Viewed Content for Links to Other Web Sites

WebAngel pre-fetches or "forward caches" data. For example, the browser (which may or may not be part of WebAngel) reports back that there is interest in a specific area of information (which means it is being displayed or TTS to the user). WebAngel monitors how long the user "listens" or views a specific card (or area of the web page), which might have hyperlinks to other content. WebAngel then pre-fetches or forward caches the new information to be split into cards ready for viewing and/ or text to speech.

Another example is as follows: The user loads a web page. As it is being downloaded (and displayed) the user reads (or listens to) the web page and its contents. If the user comes across something of interest, he/ she may "highlight" or "select" an area that he/ she is reading to give some feedback to the browser or WebAngel that this subject is of interest. WebAngel "looks" through the content for any links that are in that area and then fetches them (without output) while the user continues to read the current page.

At some time later, the user either selects a new area of interest in the current page/ card or "selects related pages" to download. If the user selects the hyperlink that is already downloaded, it is then ready for review. Selection is done with a "mouse" like device, pointer, keyboard, clicker, buttons or speech. Selection also means WebAngel keeps tract of how long the card is being displayed or read. If it is long enough, WebAngel may search the current card for links to other content and start the Forward Cache process from there.

WebAngel is capable of being commanded to "store" up information requests, and download them as fast as possible for later viewing/ listening. For example, the user may want to download all songs written and performed by Elton John. WebAngel then is "started" at some address by the user and start searching ALL links at that site. It then downloads any "hits" and stores as many as possible on some medium like a hard disk, or CD/ ROM, etc. Any other sites that are linked to the original may have other links are searched automatically.

Timer Driven Automatic Update

WebAngel is configurable to fetch Internet content automatically based on the time of day or some other event has occurred.

Favorite Refresh Automatic Update

WebAngel is configurable to automatically fetch Internet content "favorites" based on a timer or any of the other conditions listed below.

Environmental Change Automatic Update

If configured properly, environmental changes trigger WebAngel to automatically fetch Internet content "favorites" based on a timer event or any of the other conditions listed below. In this case, WebAngel is a pre-fetching engine (or user agent) that gathers local environmental parameters, sends them to an "analysis module" (part of WebAngel, which may "runs" on a different computer), which arranges for advance sending of only that data that meets the requirement of the environmental data.

Adaptable Feature Configuration

For example, suppose the device that is "running" WebAngel software is a computer in a truck, connected to the World Wide Web over a wireless connection. The computer has other inputs (e.g. Global Position or vehicle speed (MPH) reading) to notify it when the truck is moving or not. If the truck is moving (not parked), WebAngel may be configured to not display pictures or text that may distract the driver and create a safety issue. Instead, WebAngel may output by text to speech (TTS) the textual presentations of the information requested. When parked, WebAngel may be able to show the pictures and text on the display.

Another example may be, when the truck is moving, WebAngel is configured to not pre-fetch or "cache forward".

Automatic Push

On some event or time (see next section) WebAngel is capable of pushing content to a client (which under "normal" conditions, may be a server or other computer). This may be in the form of e-mail or updated content.

Changing Conditions Where WebAngel Automatically Forward Caches, Pushes or Modifies the Feature Configuration

The table below is a summary of "external" and "internal" conditions which can trigger WebAngel to forward cache, push or modify its feature configuration:

Time of Day/ Week/ Year	Time Since Last Content Update	Weather
Velocity	Acceleration/ Deceleration	Location
Specific User/ Owner	Security	Other Safety Constraints/ Danger
Vibration/ Impact/ Earthquakes	Ambient Noise	Humidity
Pitch	Depth	Altitude
Device Temperature	Ambient Temperature	Client or Server Temperature
Nuclear Radiation	Other Conditions of Devices	EMI/ RFI
Wind Velocity	Odor Detection	Ambient Light
Chemical Detection	Construction	Detour
Service/ Fuel Availability	Dust/ Pollution	Plague/ Pestilence
New Laws/ Judicial/ Government	Scheduled Time/ Event	Health of Person or People
X-Rays	Gamma Rays	Ultrasound
Traffic	Rioting	Wetness
Spectral Content of Light	Spectral Content of Sound	Acts of God
E-mail	Network Messages	New User Input
Diagnostic Failure of a Device	Internet Web Site "Hits"	Server Traffic on Network
Client Traffic on Network	Internet Traffic	

Image Enhancements

Edge Detection

WebAngel searches the image that is to be displayed for edges, where it then "outlines" the image in black or some other color appropriate to the image. There are many edge detection algorithms already developed for other applications.

Line Interleave

WebAngel takes an image and interleave intermediate pixel data for a better quality image when zoomed up or magnified. For example, here is one algorithm for doing this:

For this example, suppose the image (and display) is 100 by 100 pixels in size. It is desired to zoom up the image to double the image size or quadruple the number of pixels to display. So the new image is 200 by 200 pixels, but only 1/4th the zoomed image is displayed at one time due to display size limitations. WebAngel "fills" every other new pixel with half the value from the previous pixel with half the value of the next pixel:

Original Image
P1 P2 P3 P4 P5..... P100
P101 P102 P103 P104 P105.....P200

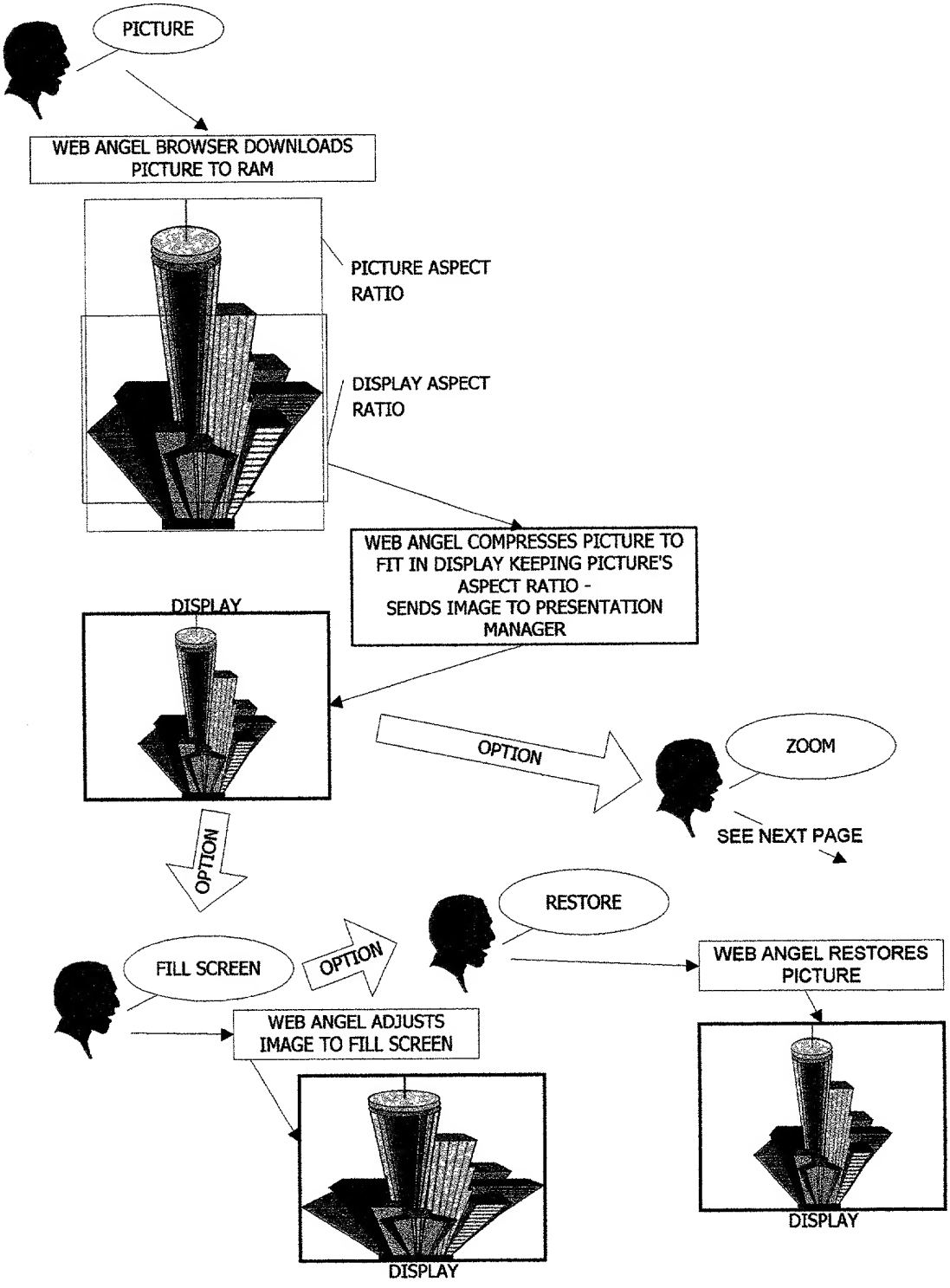
New Image:
P1 (P1+P2)/2 P2 (P2+P3)/2 P3 (P3+P4)/2 P4 (P4+P5)/2 P5 ... P100
(P1+P101)/2 ((P1+P2)/2)+((P101+P102)/2)/2 and so on....
P101 (P101+P102)/2 and so on..... P200 (which is now P300)

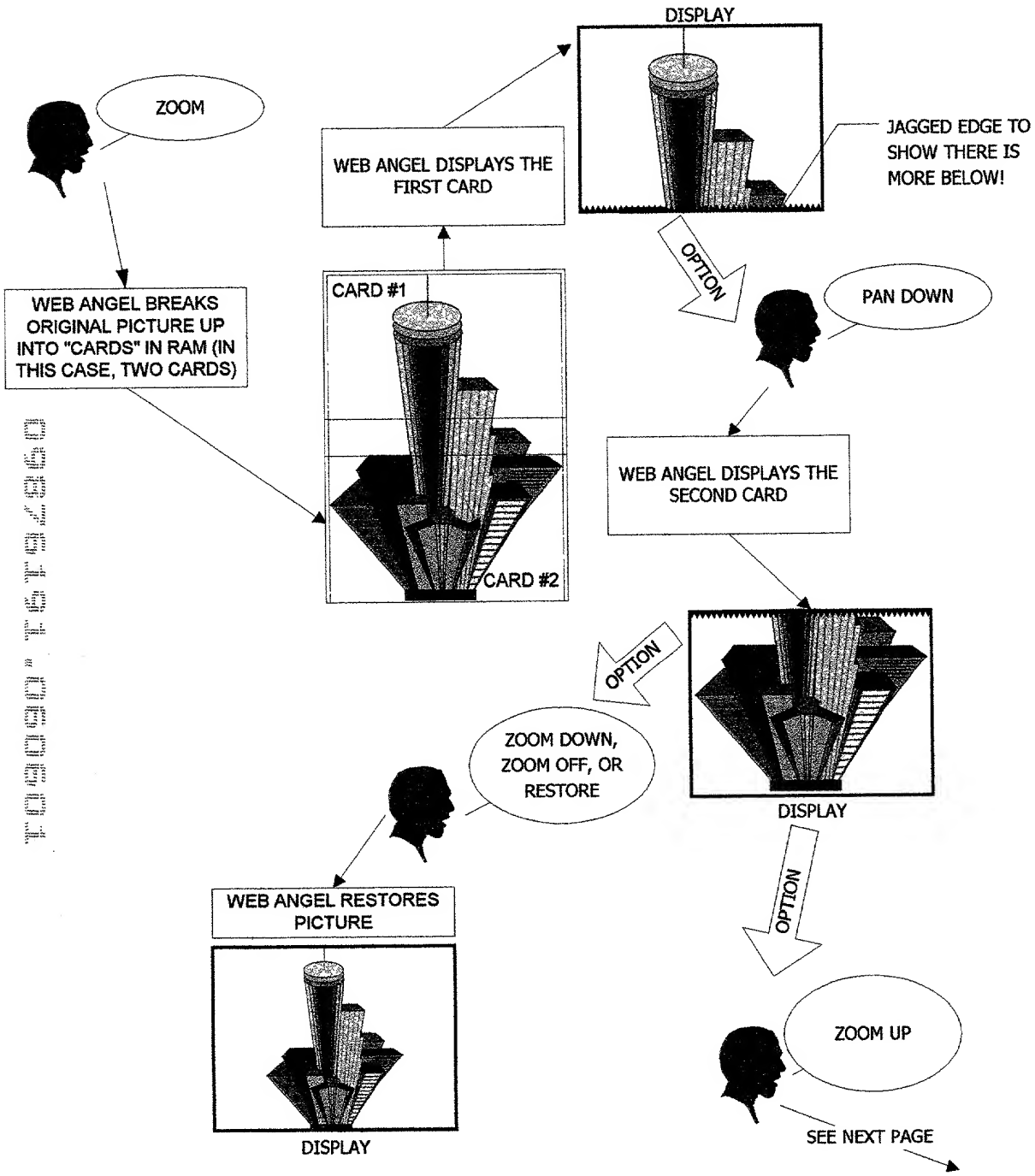
There are many line interleave algorithms already being used.

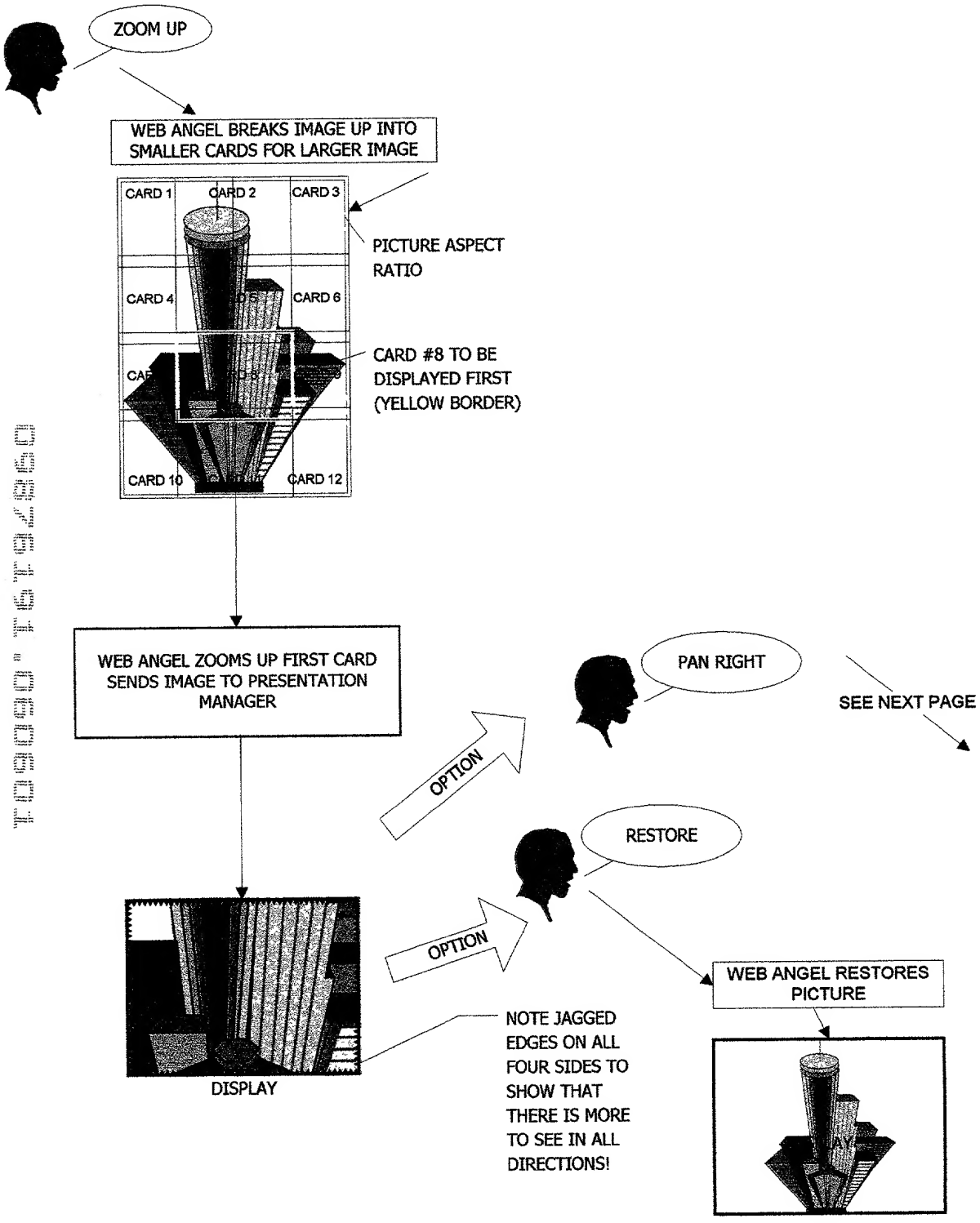
Pan and Zoom

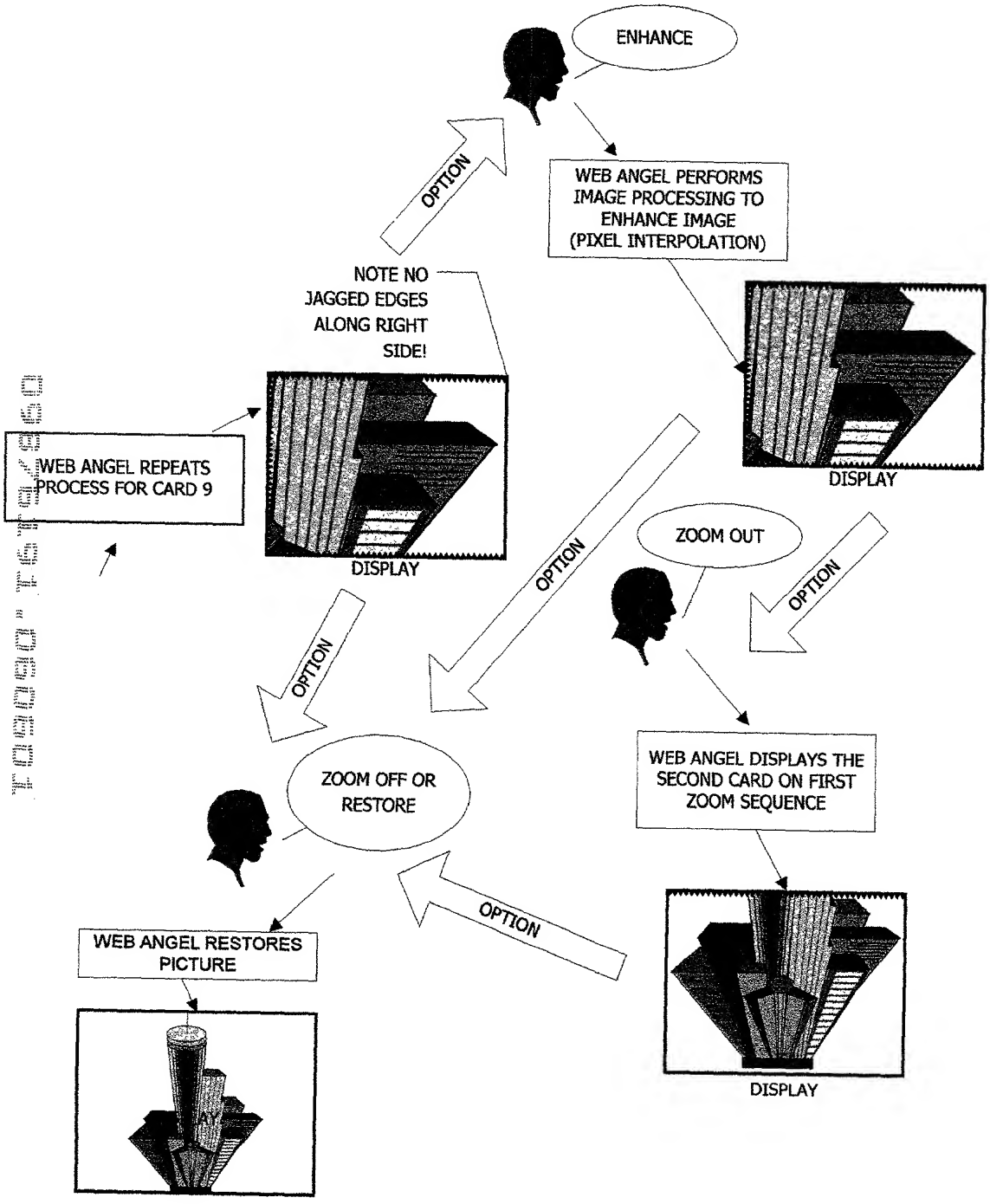
Pan and Zoom of displayed images since display may be quite small. Panning the image is done with a trackball type device to "move around" the image, or broken into pieces like in the storyboard below, or as done in the TruckPC™ section later in this document.

In the following storyboards, WebAngel has broken Internet content into cards (or received them that way if in WAP format). The operator gets to choose whether or not to view pictures. Only voice commands are shown here for simplicity sake. The "Presentation Manager" discussed below is part of WebAngel, or another application that actually displays the images:


PICTURE
WEB ANGEL BROWSER DOWNLOADS PICTURE TO RAM
PICTURE ASPECT RATIO
DISPLAY ASPECT RATIO
WEB ANGEL COMPRESSES PICTURE TO FIT IN DISPLAY KEEPING PICTURE'S ASPECT RATIO - SENDS IMAGE TO PRESENTATION MANAGER
DISPLAY
OPTION
ZOOM
SEE NEXT PAGE
OPTION
RESTORE
FILL SCREEN
OPTION
WEB ANGEL RESTORES PICTURE
WEB ANGEL ADJUSTS IMAGE TO FILL SCREEN
DISPLAY
DISPLAY


DISPLAY
ZOOM
WEB ANGEL DISPLAYS THE FIRST CARD
JAGGED EDGE TO SHOW THERE IS MORE BELOW!
OPTION
PAN DOWN
WEB ANGEL BREAKS ORIGINAL PICTURE UP INTO "CARDS" IN RAM (IN THIS CASE, TWO CARDS)
CARD #1
CARD #2
WEB ANGEL DISPLAYS THE SECOND CARD
OPTION
ZOOM DOWN, ZOOM OFF, OR RESTORE
DISPLAY
OPTION
WEB ANGEL RESTORES PICTURE
DISPLAY
ZOOM UP
SEE NEXT PAGE


ZOOM UP
WEB ANGEL BREAKS IMAGE UP INTO SMALLER CARDS FOR LARGER IMAGE
CARD 1
CARD 2
CARD 3
CARD 4
CARD 6
CARD 10
CARD 12
PICTURE ASPECT RATIO
CARD #8 TO BE DISPLAYED FIRST (YELLOW BORDER)
WEB ANGEL ZOOMS UP FIRST CARD SENDS IMAGE TO PRESENTATION MANAGER
PAN RIGHT
SEE NEXT PAGE
OPTION
RESTORE
OPTION
WEB ANGEL RESTORES PICTURE
DISPLAY
NOTE JAGGED EDGES ON ALL FOUR SIDES TO SHOW THAT THERE IS MORE TO SEE IN ALL DIRECTIONS!


ENHANCE
OPTION
WEB ANGEL PERFORMS IMAGE PROCESSING TO ENHANCE IMAGE (PIXEL INTERPOLATION)
NOTE NO JAGGED EDGES ALONG RIGHT SIDE!
DISPLAY
WEB ANGEL REPEATS PROCESS FOR CARD 9
DISPLAY
OPTION
ZOOM OUT
OPTION
OPTION
ZOOM OFF OR RESTORE
WEB ANGEL DISPLAYS THE SECOND CARD ON FIRST ZOOM SEQUENCE
OPTION
WEB ANGEL RESTORES PICTURE
DISPLAY

Grayscale Adjustment

WebAngel allows the user to adjust the gamma curves to allow for better viewing a color image on a black and white display.

Chroma

If the client device has a color display, WebAngel takes a black and white image and assign a gradually darkening color (e.g. blue) instead of black for better visibility. Ultrasound medical devices use this feature to allow detection of subtle gradations of tissue in medical images. The gamma curve adjustment feature is also incorporated (as stated above) in the "Grayscale Adjustment" section.

Multiple Displays

WebAngel is capable of output with one display format, while converting the data for a different display. For example, a computer in a truck may have a black and white primary display (for the driver and passenger) with a color RGB output for a remote display in the sleeper.

Image Measurements

It may be desirable to actually "measure" an object on the display. WebAngel allows the user to place cursors on an image and show the distance between them (based on the information provided for distance per pixel). Areas, velocities (e.g. blood flow) and even volumes of objects on images are estimated using a variety of measurement schemes already developed for medical imaging devices (e.g. ultrasound machines).

Content to Cards for Text Output

See the glossary (Appendix A) for the description of "cards" and "deck". Output Includes both Displayed Text and Speech (TTS)

Standard Markup Languages / Scripts Parsed Into Cards

SGML
HTML
XML
VML
CGI
Java
Others

Already Parsed Data From Another Source (i.e. WAP)

VML

Tones

The text to speech (TTS) output is configurable to identify when an end of a card has been read, audio file, picture or hyperlink is available. Another way to notify the user "audibly" is to generate different tones for each type of "event". The tone is generated as an "overlay", or on top of the text (or just after it).

Pause

WebAngel allows the user to "pause" reading the text or listening to an audio file.

Replay

WebAngel goes back 10 seconds or so, and replay what was just listened to.

Deck Navigation

As stated earlier, the web based content is divided up into cards by either WebAngel, another user agent, or done already in the WAP environment. WebAngel then allows the user to navigate the deck with the following features:

Go-Back or Skip

WebAngel allows the user to move to other cards backwards and forwards.

Seek

The user may have just the first line or phrase of each card read. WebAngel then automatically switches to the next card and repeats the process, until the user disables this feature to "stay" on the current card or stop the whole process. It also cab be set up to read (display) each card for a specified amount of time before switching to the next one. WebAngel identifies each new card with either a tone, text on the display or speech. If the seek feature finishes with the last card, it starts with the first one again, or prompts the user that the end has been reached with a tone, displayed text or speech.

Find Key Word

WebAngel searches the deck for key word(s) or phrases that the user specifies. It may do this before displaying/ reading any of the cards in the deck, or at any time during the "card reading/ displaying" process. Once found, the card is displayed/ read to the user as the new starting point.

Web Browsing with Kniest Wireless Devices

General Description

The content is in SGML, HTML, XML or VML format (so that it can be read on a standard VGA display also). The browser handles CGI, Java Scripts and VMLScript.

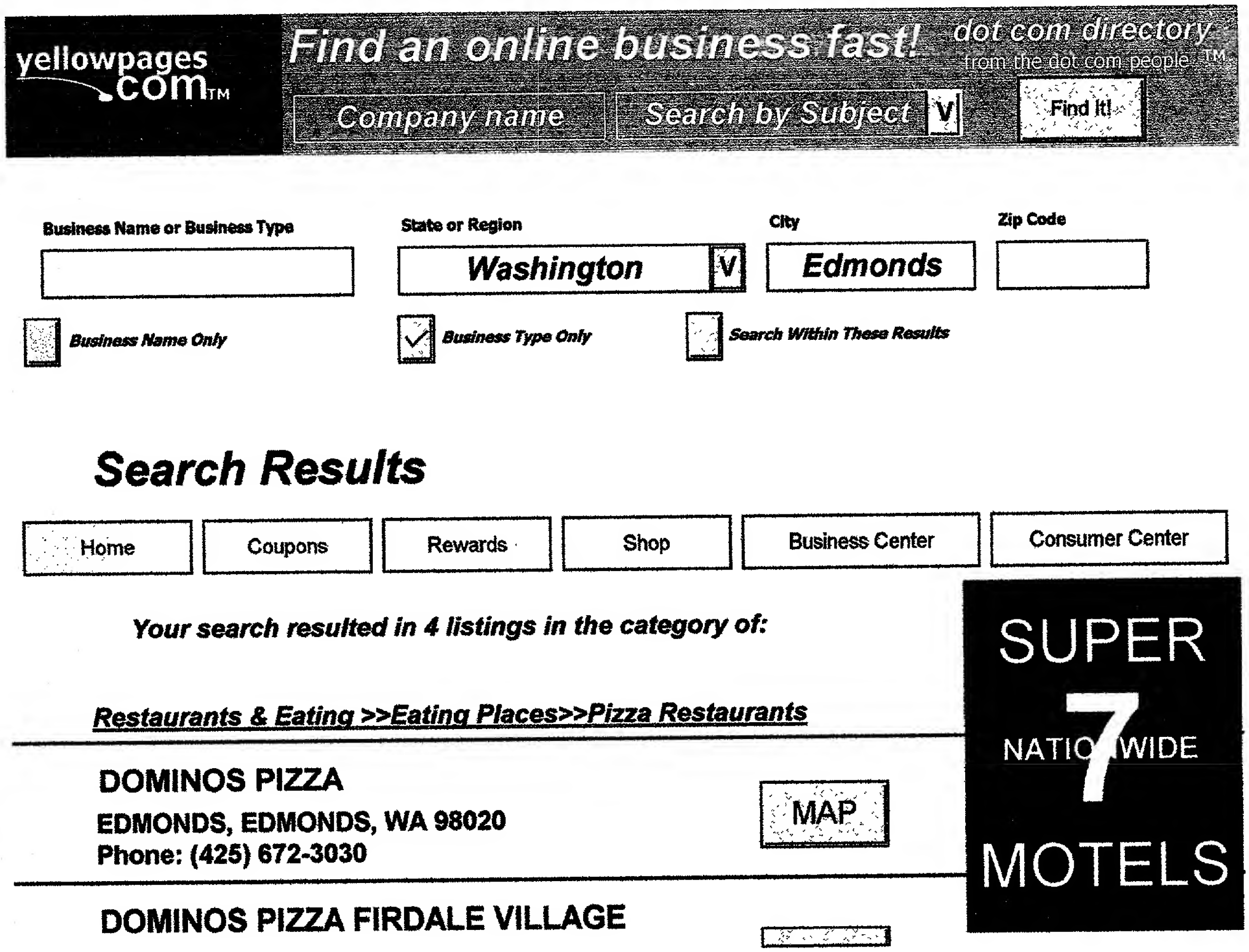
Saving Web Pages

The user can able to save at least eight web pages in flash memory.

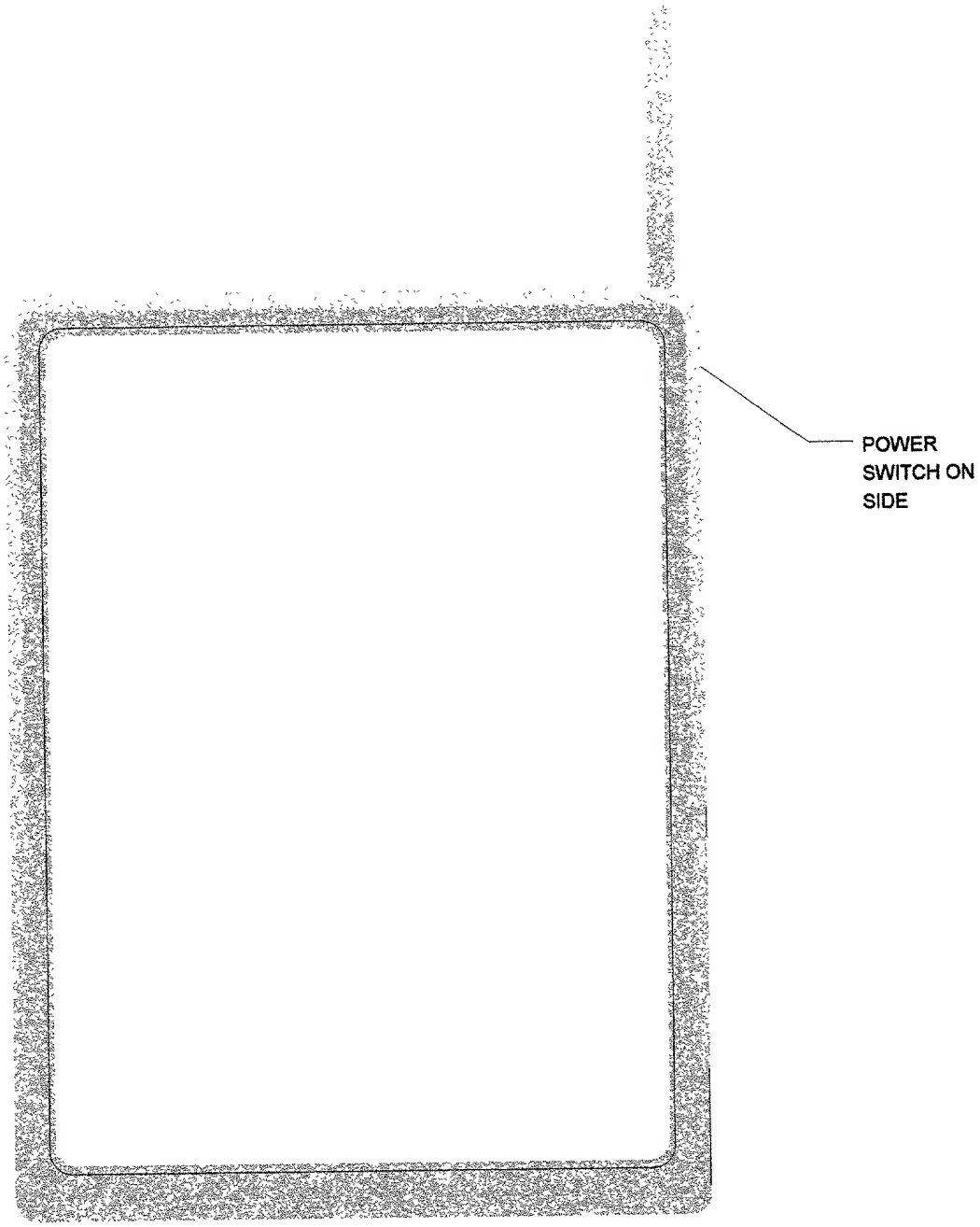
Browsing

The look and feel of the browser is outlined in the next few pages.

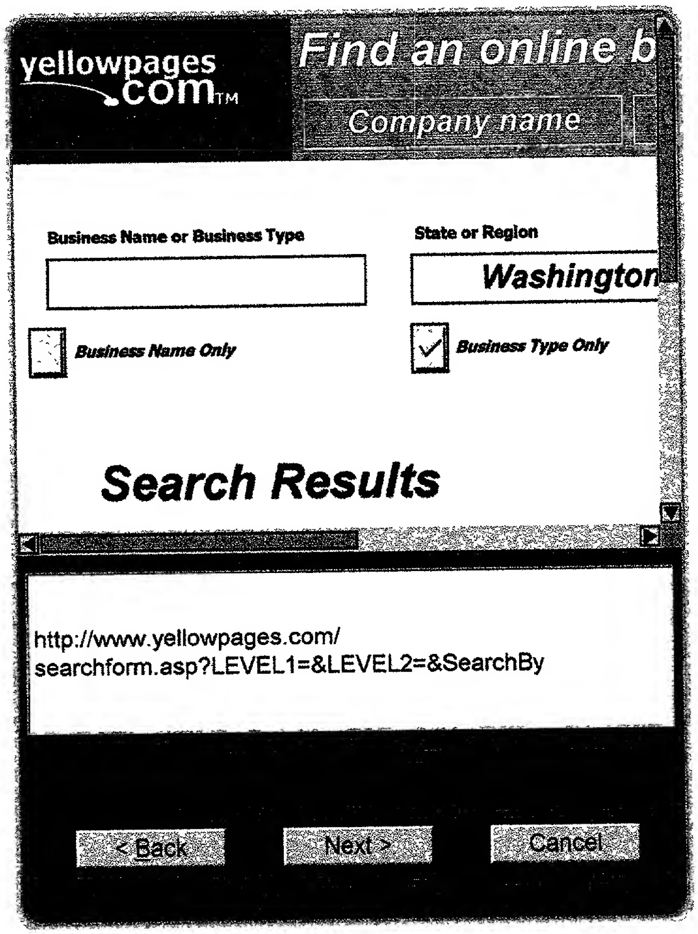
Typical Web Page



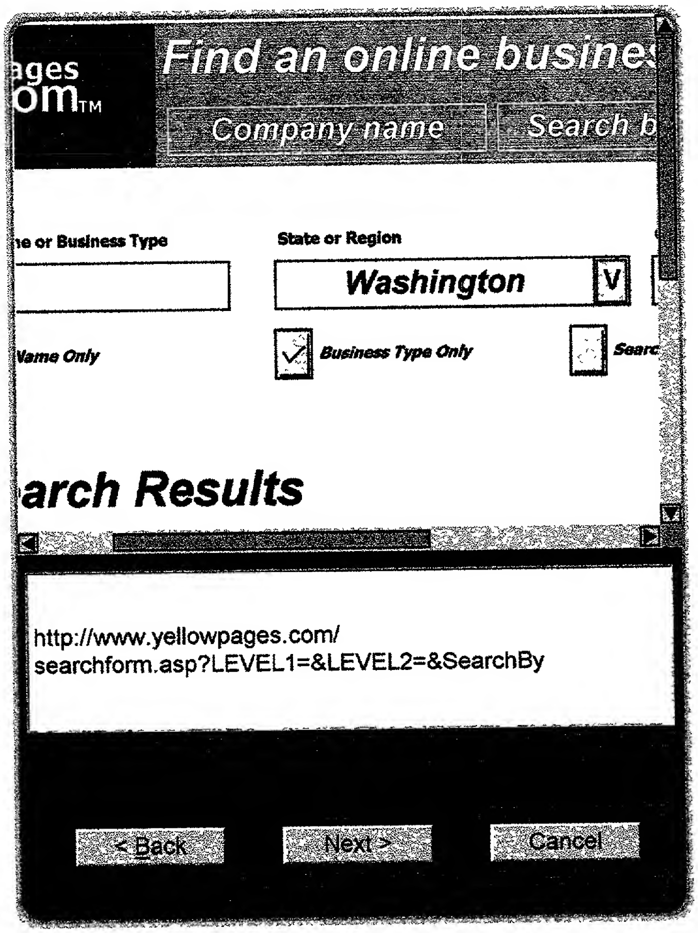
Fit it into this Small Space!



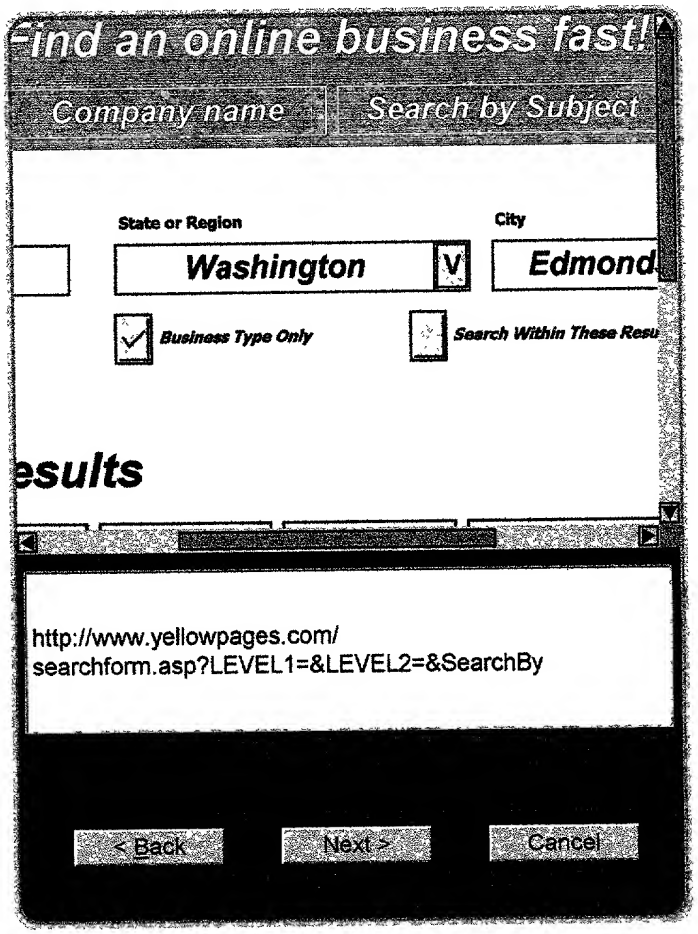
A Quarter of the Full VGA Output Fits!



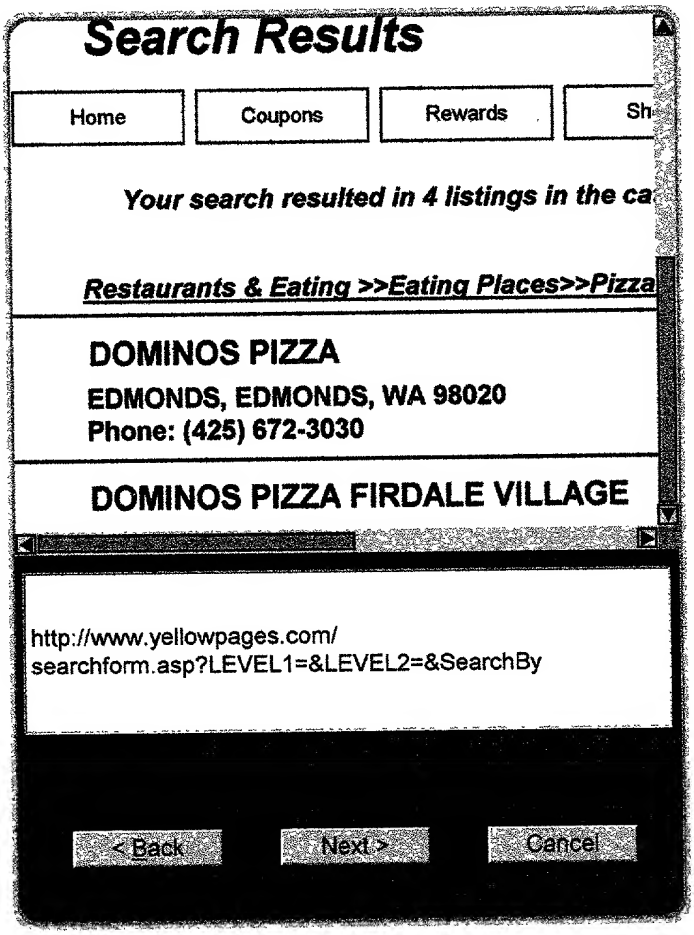
User Taps Horizontal Scroll Bar to Move Image Right



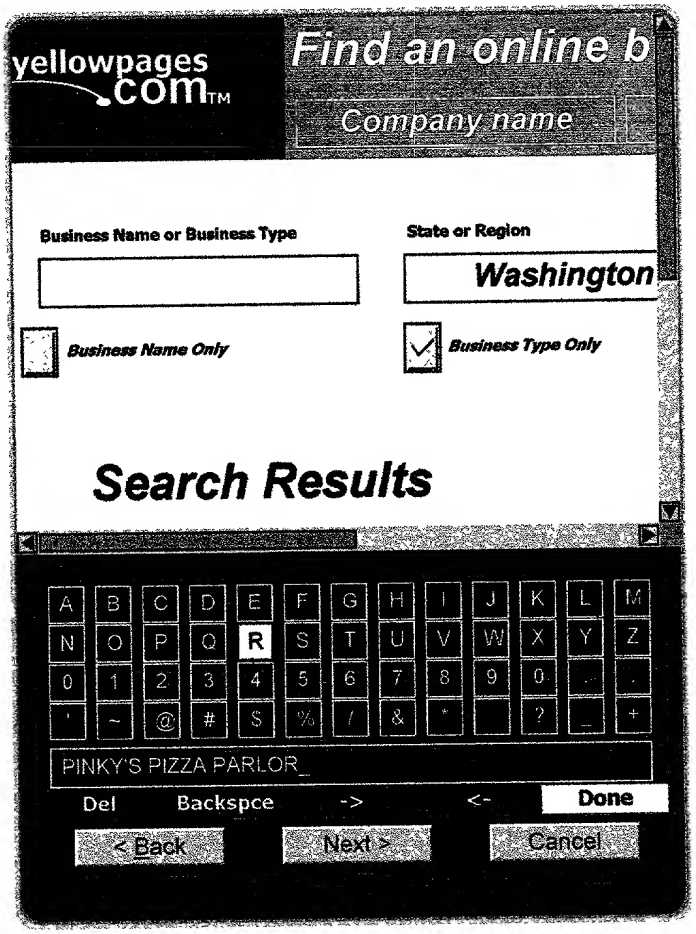
Another Tap Puts the Web Page in the Center Horizontally



Vertical Scroll Bar All the Way Down, Horizontal Bar to the Left



Text Entry Using Stylus



E-Mail Web Site Links

The browser can to "go to" a site from a hyperlink contained in an e-mail message.

Browser Configuration

Favorite Web sites

As stated earlier, the user can add/ remove at least eight favorite web sites.

If there are already eight web sites saved, the user is prompted with the following on the display: "Maximum sites have been saved. Would you like to delete an older one?" If the user responds with the "No" button, the sequence is aborted and the computer waits for the user to continue browsing.

Conversely, if the user responds presses the "Yes" soft key, the browser displays in menu format the first of the eight sites already saved and then allow the user to delete the unwanted one. If none are "over-written" then the browser starts with the first one again. The operator at any time can abort the sequence.

Sound File Playback

When a sound file is available, the web browser notifies the user that it is available. If the user selects playing it (in this case with the stylus), the file is output through the audio system.

While the sound file is being played, the display shows: "Sound File XXX". Buttons for stopping (and pause) the playback must be made available.

Text to Speech (TTS)

Some devices have the text to speech feature. Buttons are provided to "play" the text on the display through the audio system. Buttons for stopping (and pause) the playback are also available.

Help

Anytime the help button is pressed the browser displays what functionality the soft and hard keys provide.

Wearable Wireless Devices

Any of the Above Kniest Wireless Devices Wearable on Body!

Portable "Movie Screens" for Larger Images (Even Full VGA!)

Internal Video Projection Device for Screen or Wall

Projection Video can be Turned off to Save Power

Small Embedded Liquid Crystal Display Included for Control

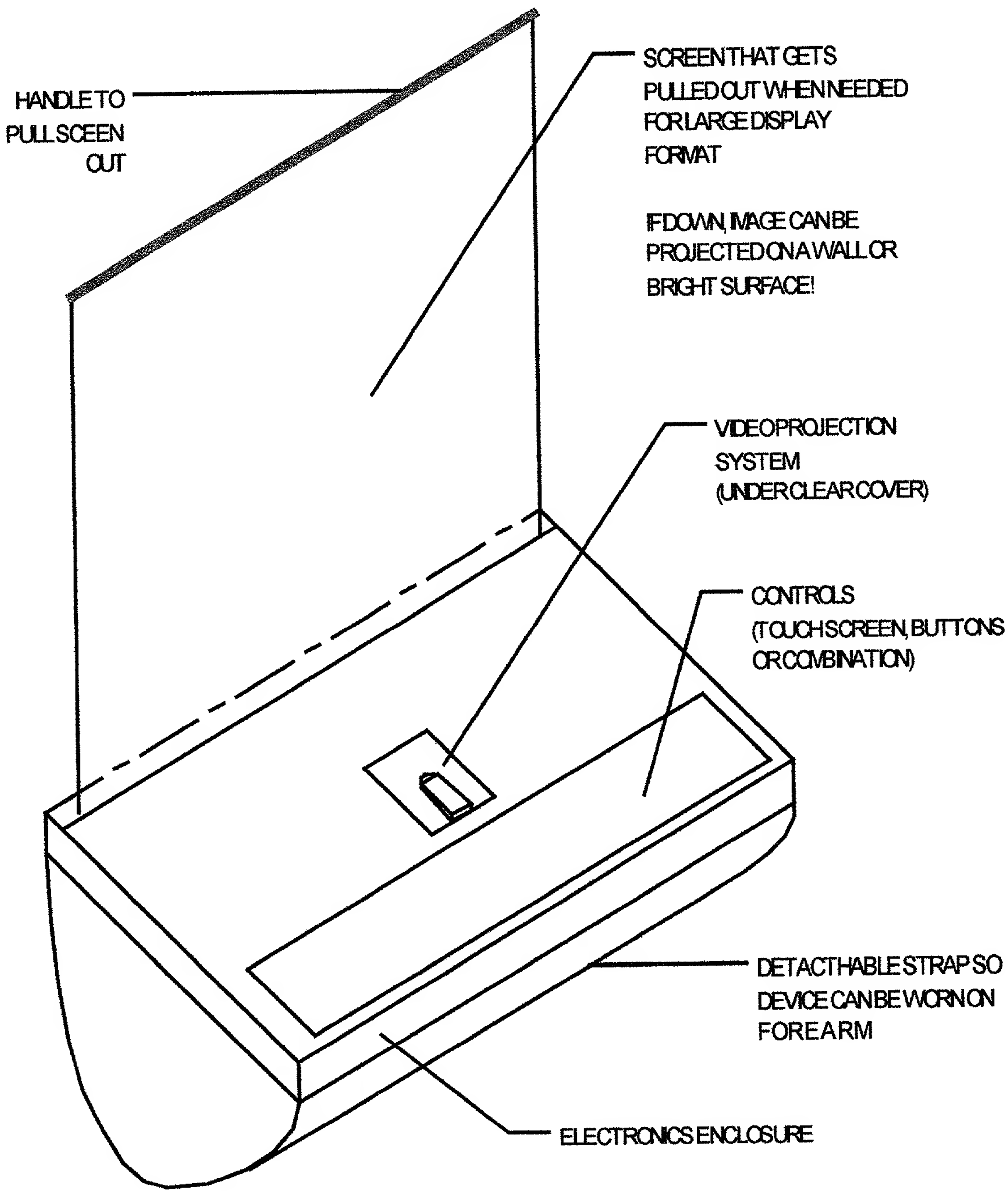
Other Models may have Buttons or "Mousepad" Device

Tape or CD Drives are in Separate Enclosure Worn on Different Part of Body

Connected to "Control Unit" (with Display) by Bluetooth Wireless or Other Radio Frequency Protocol

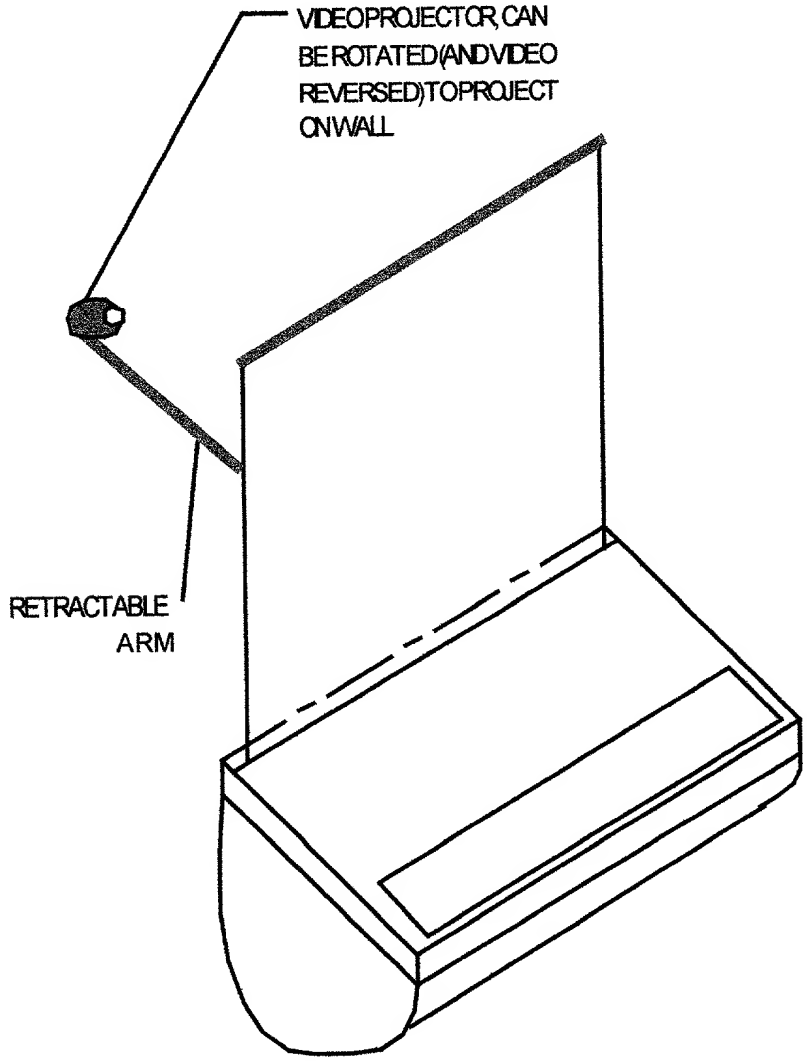
Worn on Forearm Wireless Device

Strap Detachable, so Unit can sit on Table



Another Version: Display Driven from the Rear

For Smaller Form Factor
Video Reversible, for Both Modes of Operation (Wall or Screen)

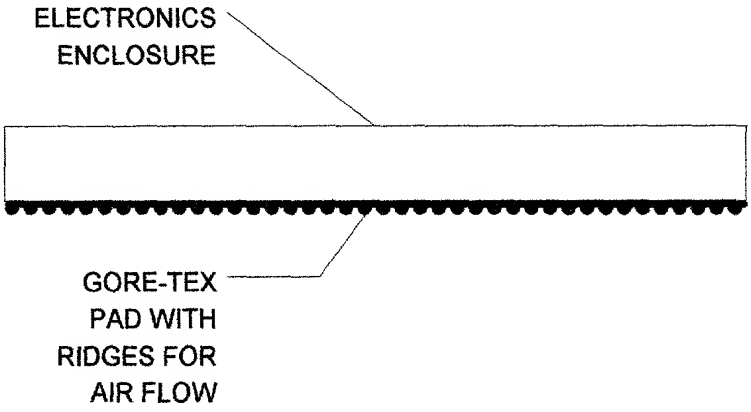


Another Version has Projector Mounted on Small Portable Stand that can be Projected on Desk or Wall.

Wireless Link (Bluetooth) with Kniest Device
Stand and Video Projector is Stored in Kniest Device when not Needed or Carried Separately

Strap Made of Gore-Tex® Type Material to Minimize Sweating

Bottom of Electronics Enclosure also Gore-Tex® Where it Meets Skin



SIDE VIEW OF ELECTRONICS ENCLOSURE

Appendix A: Glossary of Terms and Acronyms

Term/ Acryonym	Description
API	Application Programming Interface
FTL	Freightliner
GPS	Global Positioning System
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
IP	Internet Protocol
MS	Microsoft
OEM	Original Equipment Manufacturer
PC	Personal Computer
RAM	Random Access Memory
ROM	Read Only Memory
SAE	Society of Automotive Engineers
SRS	Software Requirements Specifications
TBD	To Be Defined
TCP/IP	Transmission Control Protocol/ Internet Protocol
TMC	The Maintenance Council
TTS	Text to Speech
USB	Universal Serial Bus
WWW	World Wide Web

Card	A single markup language (e.g. WML, HTML) unit of navigation and user interface. May contain information to present to the user, instructions for gathering user input, etc.
Client	A device (or application) that initiates a request for connection with a server.
Client Server Communication	Communication between a client and a server. Typically the server performs a task (such as generating content) on behalf of the client. Results of the task are usually sent back to the client (e.g., generated content.)
Content	Synonym for data objects.
Content Encoding	When used as a verb, content encoding indicates the act of converting a data object from one format to another. Typically the resulting format requires less physical space than the original, is easier to process or store and/or is encrypted. When used as a noun, content encoding specifies a particular format or encoding standard or process.
Content Format	Actual representation of content.
Content Generator	A service that generates or formats content. Typically content generators are on origin servers.
Deck	A collection of markup language (e.g. WML, HTML) cards. A deck may also be an XML document. May contain WMLScript or JavaScript
Device	A network entity that is capable of sending and receiving packets of information and has a unique device address. A device can act as both a client and a server within a given context or across multiple contexts. For example, a device may service a number of clients (as a server) while being a client to another server.
Distance root mean square (drms)	The root-mean-square value of the distances from the true location point of the position fixes in a collection of measurements. As typically used in GPS positioning, 2 drms is the radius of a circle that contains at least 95 percent of all possible fixes that can be obtained with a system at any one place.
GPS	The U.S. Department of Defense Global Positioning System: A constellation of 24 satellites orbiting the earth at a very high altitude. GPS satellites transmit signals that allow one to determine, with great accuracy, the locations of GPS receivers. The receivers can be fixed on the Earth, in moving vehicles, aircraft, or in low-Earth orbiting satellites. GPS is used in air, land and sea navigation, mapping, surveying and other applications where precise positioning is necessary.
GPS ICD-200	The GPS Interface Control Document is a government document that contains the full technical description of the interface between the satellites and the user.
JavaScript	A *de facto* standard language that may be used to add dynamic behaviour to HTML documents. JavaScript is one of the originating technologies of ECMAScript.
Modem	A modulator/demodulator. When two computers communicate over telephone lines and similar media, digital signals must be converted to analog during transmission, then back again to digital at the destination. Modems are always used in pairs, one at each end. They are rated according to the speed, typically in "bits per second," at which the information can pass through the transmission medium.
Origin Server	The server on which a given resource resides or is to be created. Often referred to as a web server or HTTP server.
Pre-Fetch	In this case, WebAngel software "looks and downloads" Internet content automatically.
Push	Unsolicited "sending of information" to a client device.
Resource	A network data object or service that may be identified by a URL. Resources may be available in multiple representations (e.g., multiple languages, data formats, size and resolutions) or vary in other ways.

Server	A device (or application) that passively waits for connection requests from one or more clients. A server may accept or reject a connection request from a client.
SGML	The Standardised Generalised Markup Language (defined in [ISO8879]) is a general purpose language for domain specific mark up languages.
Standard Positioning Service (SPS)	The normal civilian positioning accuracy obtained by using the single frequency C/A code. Under selective availability conditions, guaranteed to be no worse than ~10 meters 95 percent of the time (2 drms).
User	A user is a person who interacts with a user agent to view, hear or otherwise use a resource.
User Agent	A user agent is any software or device that interprets content (e.g., WML, XML, SGML, HTML). This may include textual browsers, voice browsers, search engines, etc.
WebAngel	WebAngel is the trademark for a kind of computer software package that runs "on top" of a World Wide Web browser (a user agent). It controls the user agent software, or it incorporates a browser. It is to be considered just part of the user agent, or all of it depending on the application.
WebAngel Client	Software subset of WebAngel software that runs on the client.
WebAngel Server	Software subset of WebAngel software that runs on a server. NOT DONE FOR THIS APPLICATION